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AMERICAN COLLEGE OF DENTISTS

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Journal

AMERICAN COLLEGE OF DENTISTS

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AMERICAN COLLEGE OF DENTISTS

Objects: The American College of Dentists "was established to promote the ideals of the dental profession; to advance the standards and efficiency of dentistry; to stimulate graduate study and effort by dentists; to confer Fellowship in recognition of meritorious achievement, especially in dental science, art, education and literature; and to improve public understanding and appreciation of oral health-service." — *Constitution, Article I.*

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Next Meeting, Board of Regents: Chicago, September 15 and 16, 1945.

Next Convocation: To be announced.

Fellowships and awards in dental research. The American College of Dentists, at its annual meeting in 1937 [*J. Am. Col. Den.*, 4, 100; Sep. and 256, Dec., 1937] inaugurated plans to promote research in dentistry. These plans include grants of funds (The William John Gies Fellowships) to applicants, in support of projected investigations; and also the formal recognition, through annual awards (The William John Gies Awards), of distinguished achievement in dental research. A standing committee of the International Association for Dental Research will actively cooperate with the College in the furtherance of these plans. Applications for grants in aid of projected researches, and requests for information, may be sent to the Chairman of the Committee on Dental Research of the American College of Dentists, Dr. Albert L. Midgley, 1108 Union Trust Bldg., Providence, R. I. [See "The Gies Dental Research Fellowships and Awards for Achievement in Research," *J. Am. Col. Den.*, 5, 115; 1938, Sep.]

Journal

AMERICAN COLLEGE OF DENTISTS



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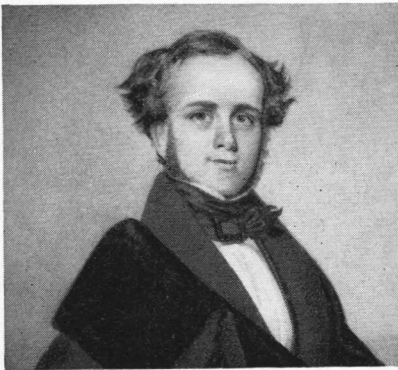
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American College of Dentists

WELLS (AGE 23) SAID: "Every trade requiring much intellectual cultivation has, in this country, a greater proportion of unqualified men in its ranks, than is the case in the enlightened parts of Europe. It is true, that in some branches, of public improvement, we leave the old country far behind: in other branches, however, Europe is far before us. The cause of this difference is found in the circumstances connected with the infantile age of our Republic. (Our young men, in many cases, are not in a condition to go through a course of study in the higher seminaries, and frequently those who do pass a collegiate course, commence practice, in their various callings, immediately on the close of their four years' term.) In Europe, most educated men are not only well educated, but, in multitude of instances, are educated veterans; and young men before they presume to cope with them for public approbation, must pass, not only four or six, as in



this country, but actually twelve, fourteen or twenty years in the universities. Hence, in a greater proportion, (other things being equal) than in this country, they understand well what they profess to understand; and hence they are likewise depended on, and quackery has less chance of practicing mischief, at least in those circles not lower than our own."

TWO TYPES OF UNDERMINING DENTIN CARIES^{1a}

BERNHARD GOTTLIEB, M.D.

*Baylor University, College of Dentistry
Dallas, Texas*

LITERATURE

Miller¹ reported that once caries has reached the dentin, there is a backward spread into the enamel. Vigo Anderson² stated that the rapid progress of dental caries is to be accounted for by shrinkage of the dentin resulting from acid action. Baumgartner³ described the entrance of microorganisms into organic strands of the enamel from which position they might penetrate into the dentin where lateral spread occurs due to the high organic content and results in an undermining of the enamel. Gottlieb⁴ showed photomicrographs of ground sections where beginning caries had reached the dentin, spreading at this point and undermining the intact enamel. In another illustration he showed shrinkage of the dentin which was produced by acid action. Gottlieb and Hinds⁵ mentioned three ways by which undermining caries develops: (1) by way of the lamellae; (2) by frontal caries reaching the dentin; (3) at the cemento-enamel junction. Gottlieb and Stanton,⁶ by experiments carried out on extracted teeth, confirmed the earlier reports on shrinkage of the dentin by acid action. Gottlieb⁷ showed a yellow pigmentation as being characteristic of tissues affected by caries. F. W. Hinds⁸ reported that yellow pigmentation is not demonstrable by

^{1a}This study was aided by a grant from Wm. J. Gies fund of the American College of Dentists. The photography was done by Charles Ervin Arnold, Dallas, Texas.

¹W. D. Miller: *The Microorganisms of the Mouth*. Philadelphia. S. S. White & Co. 1890.

²Vigo Anderson. *D. Mo. f. Z.*, 20, 97; 1902.

³Erich Baumgartner. *D. Mo. f. Z.*, 29, 328; 1911.

⁴B. Gottlieb. *Z. Stom.*, 19, 129; 1921.

⁵B. Gottlieb and E. Hinds. *J. Den. Res.*, 21, 317; 1942.

⁶B. Gottlieb and S. Stanton. *Texas State D. J.*, 61, 293; 1943.

⁷B. Gottlieb. *J. Den. Res.*, 23; 1944.

⁸F. W. Hinds. *J.A.D.A.*, 30, 257; 1943.

X-ray methods. Fish,⁹ by vital staining methods, showed that dental lymph flows from the pulp through the dentinal tubules to the dentino-enamel junction and returns toward the pulp by the way of other tubules. E. Hinds¹⁰ demonstrated that when ammoniacal silver nitrate reaches the dentino-enamel junction by the way of an enamel lamella a further spread in the dentin occurs.

FINDINGS

Fig. 1 is a ground section showing the yellow pigmentation of undermining dentin caries. The enamel surface is intact and presents a brownish pigmented appearance. The outer part (a) shows pigmentation while the deeper part (b) is normal in appearance. The zone between the pigmented and normal areas shows transverse striation. The pigmentation extends along a lamella (c) to the dentin, at which point (d) a continuation of the yellow pigmentation occurs. From this position there is no indication of extension backward across the dentino-enamel junction into the sound enamel. Some dentinal tubules are accentuated, but as yet necrosis of the dentin cannot be determined.

Fig. 2 shows a similar condition under higher magnification. A portion only of the pigmented field is observed at (a) while the transverse striation as indicated in *Fig. 1* is clearly seen at (e). The deeper part of the enamel (b) presents a normal appearance. There is no trace of shrinkage of the dentin away from the enamel in either *figures 1* or *2*.

Fig. 3 is a decalcified section showing the dentin (e) depressed, with the area between the dissolved enamel (d) and the dentin filled with a darkly stained amorphous material (f). The presence of the enamel cuticle (a) indicates that the surface of the enamel prior to decalcification was intact in this section. We have no means of determining pigmentation of the enamel surface since it was lost in preparation of this specimen.

Fig. 4 is a higher magnification of the apical end of the amorphous material as shown in *Fig. 3*. This material apparently is coagulated lymph (a). The dentinal tubuli (b) extending from the

⁹E. W. Fish. *J.A.D.A.*, 14, 804; 1927.

¹⁰E. C. Hinds. *J. Den. Res.*, 21, 457; 1942.

lymph accumulation are accentuated, signifying invasion by microorganisms. There are three wedge-like black penetrations from the lymph area into the dentin, in which no tubules are to be seen. The dentin in these areas is necrotic. The dentin appears normal in positions where the tubules are not in communication with the coagulated lymph. This shows that the source of invasion of the tubuli by microorganisms was from the coagulated lymph.

Fig. 5 is a higher magnification of *Fig. 3* showing the border between the coagulated lymph and the dissolved enamel. A homogeneous, dark material, apparently necrotic enamel, is seen between the shadows of the enamel prisms (a). At (b) there are dark isolated acid resistant threads in contrast to the neighboring intact enamel which was lost through the action of the acid necessarily employed in the preparation of the material. These threads seem to be isolated prisms, which have been invaded by microorganisms resulting in the fortifying of their protein content thus rendering them resistant to acid action.

Fig. 6 is a mesio-distal ground section of a pre-molar, presenting an intact brownish pigmented contact area. The pigment does not reach the dentin at the level of the section. The dentin (c) is shrunk from the enamel, leaving an empty space, the content of which may have fallen out. The dark area in the dentin shows a trace of yellow pigmentation. The borders of the dentin and enamel are entirely intact and show no trace of tissue defect nor necrosis.

DISCUSSION

The histopathology of dental caries demonstrates the process to be an invasion by proteolytic microorganisms and is characterized by the production of yellow pigment. These microorganisms are associated with a second group which produce acid. The presence of yellow pigment as well as acid action is readily established by means of any ground section. The slightest acid action produces transverse striations in the enamel and where these appearances are found we are entitled to assume that their presence is due to acid action. In *Fig. 2* acid has acted on the area (e) but not in the area (b). In the dentin, acid action is indicated by shrinkage of the affected dentin

(c in Fig. 6). Such a condition can be duplicated on extracted teeth through the use of acids.

If acid and yellow pigment were produced by the same microorganisms they would necessarily be observed in the same positions and of equal proportions. Such a condition does not occur, but we do find traces of yellow pigment accompanying marked acid action. This condition is also met with in inverse relations.

Figs. 1 and 2 show no shrinkage of the dentin. The enamel proximating the dentin is light in both sections and is especially so in *Fig. 2*, where it is of considerable width. In both sections, pigmentation (black in the photograph) has already occurred in the dentin. This yellow pigmentation was transmitted to the dentin by way of the lamella (c) and as yet this area shows no sign of acid action. These illustrations show that the organisms responsible for the yellow pigment penetrate at a faster rate than those which produce acid, provided the invasion is by the way of the lamella. This also shows that they are independent of each other, and that organisms producing the yellow pigment are not dependent upon previous action of acid.

If, however, a lamella is not present, the acid-forming organisms penetrate by way of the prism sheaths, while the ones producing the yellow pigment follow secondarily. This condition is one of frontal caries, which presents a wide area of pigmentation on the surface of the tooth, which becomes narrowed at the depth of penetration. *Fig. 1* illustrates such an invasion by way of the prism sheaths. The transverse striation of the peripheral strip of the non-pigmented enamel (b) is especially clear to the left side of the lamella. *Fig. 2* shows spear heading transverse striation (e). *Fig. 6* shows an area of frontal caries with the enamel surface intact. Upon reaching the dentin the microorganisms find more favorable conditions for growth and in turn produce more acid, decalcifying the dentin, which results in a shrinkage at the dentino-enamel junction. The production of acid in this region is apparently greater than in any part of the enamel. Yellow pigmentation is always observed in dentin which has been affected by acid. In superficial parts of the tooth isolated areas of acid action or spots of chalky enamel without a trace of yellow pigmentation are observed. This condition is not one of

caries. In thicker enamel layers we have never been able to determine such areas of acid action which penetrated independently of yellow pigmentation. In contrast, yellow pigmentation has been seen to progress to the dentin by way of an enamel lamella without an accompanying acid action. Thus deep penetration of acid producers appears to be dependent upon the organisms producing the pigment, whereas yellow pigment producers may act independently.

In *Fig. 6* the area between the dentin and enamel caused by the shrinkage of the dentin (b) is an empty space. In some ground sections this space is filled with an intensely yellow colored amorphous material, the properties of which could not be determined, nor was it similar to the necrotic tooth tissue forming the content of a carious cavity. Both the enamel and dentin borders are smooth and do not show any trace of defect. Under higher magnification the undisturbed histological structure of the enamel and dentin can be observed, and in no place can necrotic tissue be found. Upon examination of decalcified sections a number of similar stages of beginning caries was found and shrunken dentin filled with amorphous material could be demonstrated. In this way it could be established that the yellow amorphous material seen in ground sections was not an artifact. The records of such teeth as well as the appearance of the sections demonstrate that neither air nor saliva could occupy this space, which formed a vacuum. This vacuum aspirates any fluid in its immediate neighborhood. Since the only material of this nature near the dentino-enamel junction is the dental lymph, it is suggested that nothing other than this dental lymph could be aspirated into this space. The stagnating lymph coagulates in this area and is the material (f) which occupies the space of the shrunken dentin in conditions such as illustrated in *Fig. 3*.

Compared with enamel the coagulated lymph is an excellent culture media allowing microorganisms to multiply and invade the dentin as well as the enamel. In *Fig. 4* we see the apical end of an area containing coagulated lymph. The dentin (b) adjoining this lymph shows invasion by microorganisms while the dentin (c) not in contact with this lymph is free of organisms. In *Fig. 5* the enamel shows threads resisting decalcification (b) and again illus-

trates that the invaded enamel becomes more resistant to acid action.

Two different types of undermining dentin caries have thus been demonstrated, which can only be explained by assuming that caries is the result of action by two kinds of microorganisms. The type of dentin caries depends upon which group reaches the dentin first. *Figs. 1 and 2* show that the type producing yellow pigment was the first to invade the dentin. This has occurred by way of a lamella, and no change in structure resulting from the yellow pigmentation can be demonstrated by means of the X-rays. If, however, the acid producing microorganisms invade the dentin by way of the prism sheaths the course of the carious process is quite different and results in decalcification and shrinkage at the dentino-enamel junction. This type of caries can be demonstrated by use of the X-ray.

SUMMARY

1. Two forms of caries, producing undermining at the dentino-enamel junction, are described. One presents a spread of yellow pigmentation beneath an intact enamel layer. The second type shows dentin shrinkage and is a result of acid action.
2. In the first form apparently proteolytic microorganisms reach the dentin by way of a lamella. In the second form shrinkage of the dentin is caused by acid producing microorganisms spearheading along the prism sheaths.
3. The dentin by shrinking produces a vacuum into which dental lymph is aspirated from the dentinal tubules and coagulates.
4. This coagulated lymph offers an ideal culture media from which microorganisms further invade the enamel and dentin.
5. The yellow appearance of this coagulated lymph in ground sections suggests the production of pigment by microorganisms.
6. The dark shadow showing in an X-ray at the dentino-enamel junction is indicative of loss of calcium salts and has been produced by acid decalcification.
7. The presence in the X-ray of a shadow at the dentino-enamel junction is indicative of the creation of a vacuum.

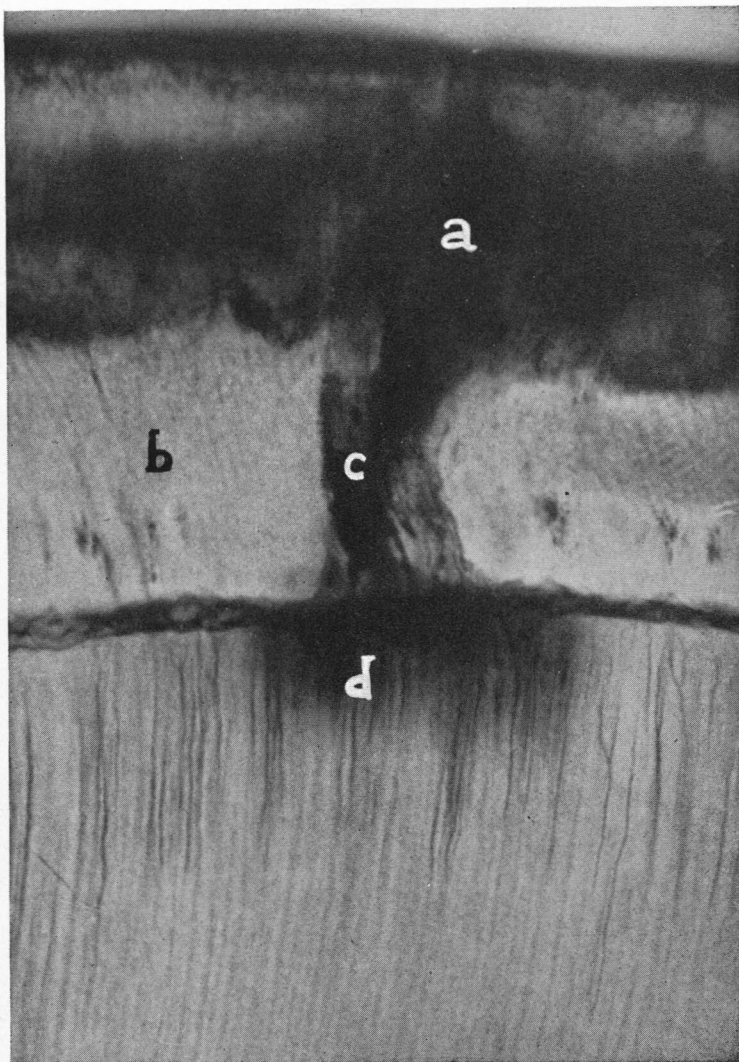


FIG. 1. GROUND SECTION SHOWING YELLOW PIGMENTATION OF UNDERMINING DENTIN CARIES. THE ENAMEL SURFACE IS INTACT AND PRESENTS A BROWNISH PIGMENTED APPEARANCE. THE OUTER PART (A) SHOWS PIGMENTATION WHILE THE DEEPER PART (B) IS NORMAL IN APPEARANCE. (C) A LAMELLA EXTENDING FROM THE ENAMEL SURFACE TO THE DENTIN. AT THE ENTRANCE OF THE LAMELLA INTO THE DENTIN IS AN AREA (D) SHOWING YELLOW PIGMENTATION.

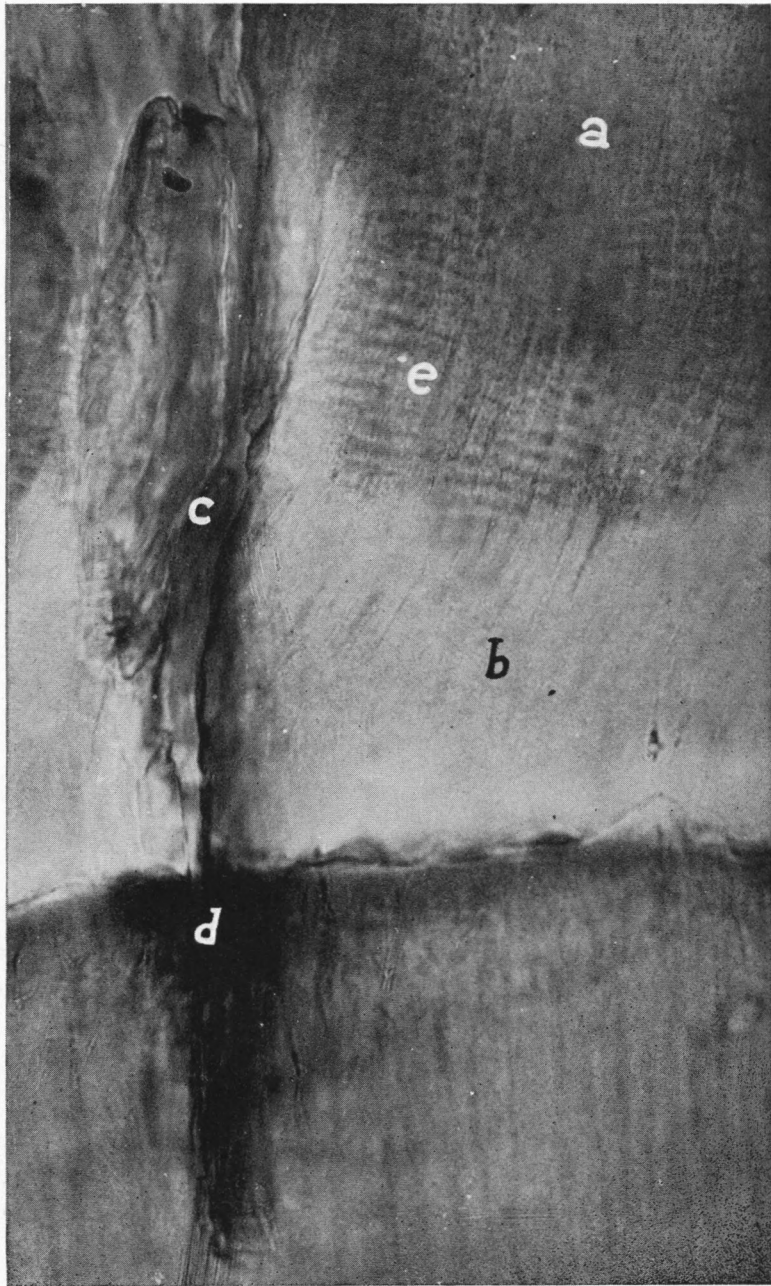


FIG. 2. GROUND SECTION OF A TOOTH SHOWING A BROWNISH PIGMENTED ENAMEL SURFACE. (A) BROWNISH PIGMENTED ENAMEL, (E) ENAMEL SHOWING TRANSVERSE STRIATION, (B) NORMAL APPEARING ENAMEL, (D) YELLOW PIGMENTED DENTIN AT THE ENTRANCE OF THE LAMELLA (C).



FIG. 3. DECALCIFIED SECTION. (D) REGION FROM WHICH THE ENAMEL HAS BEEN DISSOLVED. (A) ENAMEL CUTICLE WITH A NECROTIC DEPOSIT ON THE SURFACE (B). (C) BASE OF THE CREVICE. (E) DENTIN. (F) COAGULATED LYMPH IN A DEPRESSION CAUSED BY SHRINKAGE OF THE DENTIN.

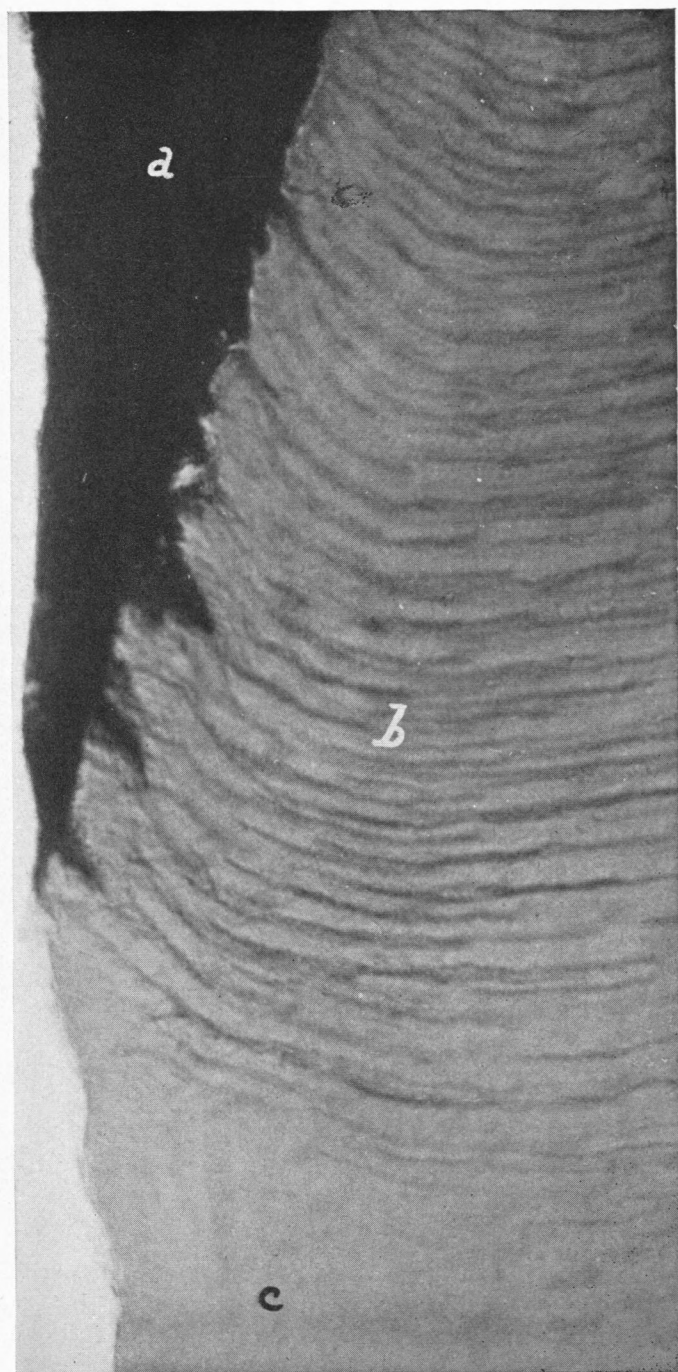


FIG. 4. HIGH MAGNIFICATION OF THE LOWER END OF THE LYMPH DEPOSIT SHOWN IN FIG. 3. (A) COAGULATED LYMPH. (B) INVADDED DENTINAL TUBULES. (C) NORMAL DENTIN.



FIG. 5. HIGHER MAGNIFICATION OF ENAMEL SIDE OF LYMPH DEPOSIT SHOWN IN FIG. 3. (A) NECROTIC ENAMEL. (B) INVADED ISOLATED ENAMEL PRISMS.

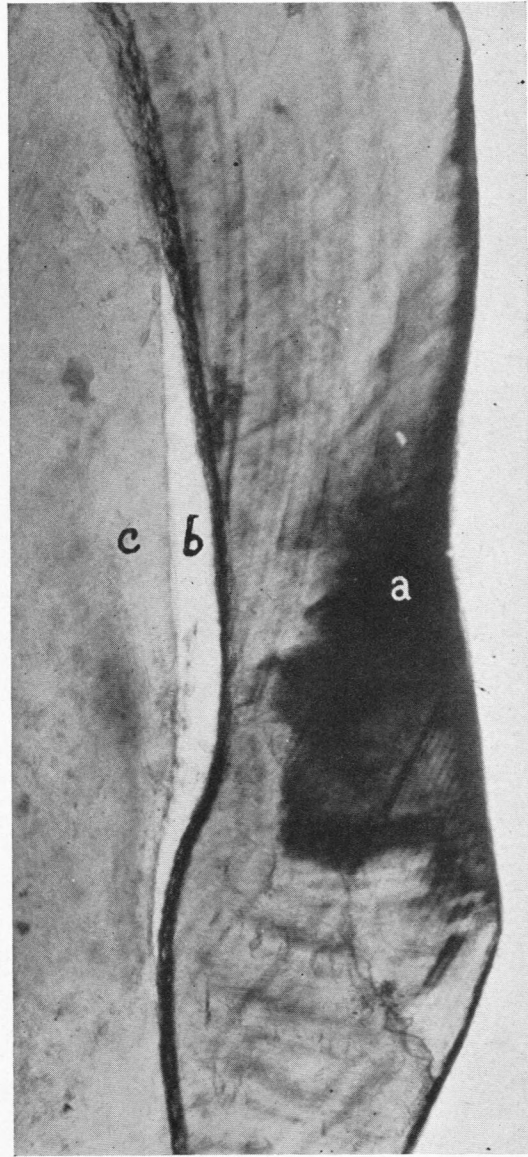


FIG. 6. GROUND SECTION OF A TOOTH SHOWING AN UNBROKEN BROWNISH PIGMENTED CONTACT SURFACE (A). (B) SHRINKAGE SPACE BETWEEN THE ENAMEL AND DENTIN. (C) SHRUNKEN DENTIN WITH INTACT SURFACE.

LIFE AND LETTERS OF HORACE WELLS¹

(Continued)

W. HARRY ARCHER, D.D.S., *Pittsburgh.*²

A letter³ by Horace Wells, written just after his return from Europe, is particularly interesting. It describes the reason for his visit and what took place while he was in Europe. Here again we have in this letter a reference by Horace Wells to his health. Howard Raper has long advanced the idea that Horace Wells had tuberculosis.^{3a} This letter strengthens that theory. However, it is the description of his treatment "as a great man" for his discovery of anesthesia by the prominent people of Paris which is particularly informative.

1847—

Letter to mother and sister:

Dear Mother & Sister M.

Hartford, March 28, 1847.

You have undoubtedly thought strange that I have not written before, for a long time has elapsed since you have heard direct from me. I will now proceed to tell the whole secret. In your letter to Elizabeth a short time since you ask if I have taken wings and flown away. In answer to this I will say yes and at the time that letter was written I was flying over Europe as fast as rail road cars could carry me. Don't be alarmed for I am safe in America again. On the 24th of Dec. last just for a little recreation, I sailed for Liverpool with the intention of visiting London and Paris, which object has been accomplished. I have just returned with better health than I have enjoyed for years before, having seen much to interest and instruct. I had a rough passage out but not a very long one, being 24 days to Liverpool—this place is remarkable for nothing, except its magnificent docks, as you are aware that its commercial business is perhaps second to none in the world—from thence I proceeded to London at the rate of some 40 miles an hour. I arrived there the day before the meeting of Parliament and I had the

¹Additional material since previous publication. See *J. Am. Col. Den.*, 11, 81; 1944 (June).

²See Footnote 1, *J. Am. Col. Den.*, 11, 83; 1944, June. The complete collection of Wells material is in the University of Pittsburgh, School of Dentistry.

³Copy of letter written by Horace Wells to "Dear Mother & Sister M." Embodied in this letter is a note from Elizabeth to "Dear Mother," and also one from Charles Wells to "Dear Grandmother."

^{3a}Personal communication.

pleasure of seeing one of the most splendid sights ever beheld by mortal eyes. I mean so far as it is in the power of man to create splendor—This was the occasion of the meeting of Parliament when the Queen proceeds from Buckingham Palace to the House of Lords to address Parliament in person from the throne. I succeeded in getting a good "Standee" near the entrance of the Palace and had a fine view of Queen Victoria and Prince Albert, also the whole of the Royal escort. The Queen looked very much like the portraits we see of her and is much prettier than I had supposed from hearsay. The horses and entire equipage exceeded anything I had ever imagined to exist. The following day I had a near-view of the crown which was deposited in the jewel room of the Tower, this crown which was worn on this occasion cost five millions of dollars—look on this picture and then look on that which shews us starving millions who are subjects of her Majesty—it is truly a painful contrast. After visiting the principal sights of London I proceeded to Paris by way of Havre. I like Paris much; the spacious grounds planted with magnificent trees in the city, thronged with a people who seem to be intent on enjoyment, conspire to make the visitor feel happy in spite of himself. Although I had no intentions of having anything to say about ether or gas which has made so much noise of late, yet when it was known that I was in Paris, I was politely told that I was a *great* man!! for my name had gone before me. You are aware that Drs. Jackson and Morton have been claiming a discovery which properly belongs to me. Dr. Jackson it seems had sent out letters to Europe claiming the discovery, he therefore was first known there—but soon after an article which was published in the Boston Medical Journal which gave me the credit of it was republished there—by the way you cannot conceive what excitement there is in Europe on this subject—indeed it is the topic of the day and is admitted by all to be the most important discovery of the age, and they are desirous of knowing who is the discoverer and it is rumored that whoever substantiates his claim to priority is to receive a pension from the French Government. Well, after it was known that I was in Paris I was invited to address the various Scientific Academies upon the subject—which I did—and not only this, several gentlemen wearing the Royal Ribbon interested themselves in my behalf and are now electioneering for me with a right good will. I was invited to parties, soirees, balls and dinners constantly for the last 10 days of my residence in Paris; indeed balls and parties embracing the aristocracy of Paris were given in honor of me—in short I was quite a Lion, having horses and equipage second only to that of the King placed at my command. I also had the offer of becoming dentist to his Majesty Louis Philip, King of France—Dr. Jackson has influential friends in France also and he will do his best to establish his claim to this discovery although he

really has no right in justice to this honor yet it is not impossible but he may outgeneral me. I am now getting my evidence, taking affidavits, etc. which will go out by the next steamer. Mr. Bennett editor of the New York Herald is now in Europe and I see that he has written home a letter which is going the newspaper rounds. He states that I am to return to Europe this Spring—this is the first news I have had of it for I have no idea of returning. I understand that a petition has been presented to Congress in reference to furnishing this gas to the Army in Mexico and to remunerate the discoverer in the sum of \$100,000. When it was stated that Jackson and Morton were the men, the member (Mr. Dixon) from Connecticut rose and stated that Drs. Jackson and Morton were not the discoverers but this honor belonged to Dr. Horace Wells of Connecticut. Congress appointed a committee to enquire into the matter and I have just received a letter from that committee requesting me to furnish them with the evidence of my priority of discovery, as they had been informed that it properly belonged to me. As my sheet is full I must close. Please to let Mary see this letter and tell her it is for herself as much as for you. I do not write her a separate letter for it is impossible for me to surmise where she is at present as she is about moving. Remember me to all.

Your affec. son

HORACE.

Dear Mother:

You will doubtless be surprised at this letter and also think it strange we should be silent on such a voyage. I have wished many times during Horace's absence that you knew about it but Horace felt it would be so short an absence it would be best to keep it a secret till his return as he knew you would feel anxious concerning him. He has returned safe and perfectly well, our friends say they hardly know him he is so fleshy. He has also become quite a distinguished man and Hartford citizens are quite proud of him. I hear it rumored he will be a rich man and I am sure he is entitled to it. Your letters have been truly welcome, the last one came about the time H—— arrived. I felt anxious to hear from Capt. Cole and am glad to hear he is recovering. You may expect a small pamphlet concerning the gas which Horace is having printed in a few days. Remember to all and please write soon and congratulate us.

Yours,

ELIZABETH.

Dear Grand Mother.

I have received your kind letter and in answer Would say that I am quite Well and hope you are enjoying the same blessing.

CHARLES WELLS.

Hartford March 7th

Elisabeth Permit me to suggest
the propriety of making my visits
periodical for the present.

I would therefore propose to make you
a one half-hour call, on each Tuesday
evening at 7 $\frac{1}{2}$ o'clock.

If this time would be inconvenient, I
hope you will not fail to inform me.

If I mistake not, the right-hand bell
belongs to you. If I am mistaken please
inform me: the mistake itself would
be a small one, but sometimes little
things cast great shadows.

Yours &c
Horace

SECOND LETTER TO MISS WALES WRITTEN IN 1838. SEE *J. Am. Col. Den.*, 11, 93;
1944 (JUNE). SEE ALSO *Dental Rays*, 14, 74; 1939 (MARCH).

1903—

News item, *Hartford Post*, Monday, April 13, 1903:

EASTER CELEBRATED—GENERAL OBSERVANCE OF THE DAY IN
HARTFORD—PERFECT WEATHER BRINGS OUT GREAT CROWDS

IMPRESSIVE VESPER SERVICES AT THE CENTER CHURCH—
KNIGHTS' TEMPLARS' EVENING OBSERVANCE

Seldom, if ever, has Easter Sunday been celebrated more generally or more joyously in Hartford than that of yesterday. The day was a perfect one in a succession of perfect days, thanks to the early spring, and all nature seemed in a mood typical of the day and the spirit of it. The learned efforts of the weather guessers at Washington went amiss and the perfect Easter morning was enjoyed the more for the fact that it didn't fit in with the doleful quotations from the weather trust.

Hartford's streets were thronged yesterday with a well dressed and joyous crowd and Hartford churches never contained happier and larger congregations, gathered to hear in song and story the momentous lesson of the day. Such a wealth of floral tributes to the occasion was never before gotten together; the songs of praise and thanks from choirs and congregations were never greater in volume and melody; Hartford preachers with one accord and without regard to denomination, discoursed upon the wondrous Easter story and the day was beautifully, happily observed. That its joyousness should find mute expression in the donning of fine raiment was natural and, looked at in this light, the tribute to the occasion was an eloquent one.

LARGE CHURCH GATHERING

The vesper service at the Center Church yesterday afternoon was made notable by the large and distinguished congregation gathered, the occasion being the observance of the placing of an artistic memorial window in the church by Charles T. Wells, in memory of his father, Dr. Horace Wells, discoverer of anesthesia, and of his wife, Elizabeth Wales Wells. The church was filled to its greatest capacity and among those who were present were the Hartford Dental Society as a body, Lieutenant-Governor Henry Roberts, Senator John M. Ney, Mayor Ignatius A. Sullivan, Charles T. Wells, guests of the Dental Society; Dr. A. C. Fones of Bridgeport, ex-president of the Connecticut State Dental Association; Dr. F. Hindsley, secretary; Dr. C. C. Strong and Dr. E. B. Griffith, treasurer of the State Association; Dr. G. E. Nettleton, Dr. E. S. Gaylord, president of the New Haven Dental Society; Dr. D. W. Johnson, all of New Haven; Dr. A. J. Flanagan and Dr. N. Morgan of Springfield, Mass.; Dr. G. E. Maxfield of Holyoke, Mass.; Dr. J. T. Barker of Wallingford, recorder of the State Dental Commission; Dr. E. W. Pratt of East Hartford, president of the State



CHARLES THOMAS WELLS
ONLY CHILD OF DR. HORACE WELLS. PHOTOGRAPH TAKEN WHEN CHARLES WAS IN HIS 30'S.

R. S. DeLameter, Photographer
258 Main Street, Hartford, Connecticut

MRS. HORACE WELLS

PHOTOGRAPH TAKEN WHEN MRS. WELLS WAS APPROXIMATELY 50 YEARS OLD. MRS. WELLS WAS EMBITTERED AT THIS TIME BECAUSE OF CONGRESS'S FAILURE TO RECOGNIZE HER LATE HUSBAND'S CLAIM AS THE DISCOVERER OF ANESTHESIA.

R. S. DeLameter, Photographer
258 Main Street, Hartford, Connecticut



Dental Commission, and Dr. W. H. Loomis of Rockville, member of the State Dental Commission.

The usual vespers service was observed, the music being particularly beautiful, and the pastor, the Rev. Rockwell Harmon Potter, referred in his sermon to the occasion which brought the noted assemblage together. The nineteenth century, he said, was one of great inventions and of great discoveries for the benefit of mankind and his uplifting and progress. In speaking of the discovery of anesthesia as one of these, Mr. Peters said:

"It was not an invention, but was the finding out of God's thought for the human race. That keen sense of vision, that earnestness of purpose which brought to the world one of God's noblest blessings, has been recognized by the city and by the state in the statue of Dr. Horace Wells on Bushnell Park, and the profession which he honored has marked the very spot upon one of our thoroughfares where this discovery was made, where, having dared death and passed through the valley, he came forth bringing the pearl of great price with him. It is for us today to take note of the loyal devotion of a son who has caused a memorial of his honored father to be placed within the walls of this church. The symbolic figure of Righteousness protecting Mercy bring to us the thought that the universal sentiment of Mercy is speaking eloquently of the champion who could make her mission effective. The attitude of Mercy is one of thanksgiving to the truth. She no longer weeps ineffectively at the presence of pain. It is worthy that such memorials should be placed within the church.

"It is a heritage of our splendid Puritan ancestry, this unfolding of God's purpose and thought towards mankind, and the greatest men are those who find out that thought, those who catch the vision, who are brave enough to scale the heights or go down into the depths and reveal to others the thought they have seen. It is not without danger, not without fear, that he whom we are commemorating found out this great boon and gave it to us. Unbounded multitudes living, and those who have passed away, testify to the ministry of sympathy through the hands of Horace Wells."

The window is a beautiful one, particularly rich in its deep and soft coloring, the figures are expressive, the posing effective and the general plan in complete harmony with the windows near it. It is from the brush of Frederick Wilson of the Tiffany Studio in New York.

LONDON DENTISTS HONOR WELLS IN 1873⁴

At the conclusion of a campaign to raise a testimonial fund for the benefit of Mrs. Horace Wells, as an "expression of English gratitude for the benefit conferred upon humanity by the labors of

⁴Reprinted from *Dental Rays*, 14, 3; 1939 (March).

Horace Wells,"² the following was engrossed on vellum and was forwarded to Mrs. Wells, accompanied with the amount subscribed:

At a meeting held 25th March, 1873, at 6, Cavendish Place, London, W.

It was resolved that the sum of money subscribed by several Members of the Medical and Dental Profession and others in England, be forwarded to Mrs. H. Wells as a slight testimonial to the merits of her late husband Horace Wells (of Hartford, Connecticut, U. S.) to whom the world is indebted not only for the introduction of Nitrous Oxide as an Anesthetic but also for giving that impetus to the study of Anaesthesia which has resulted in the introduction of ether, chloroform, and various other agents for effecting that object.

Signed in behalf of the Committee

JOHN ERIC ERICHSEN . . . *Chairman.*

Dr. Frederic T. Murlless, Secretary of the Horace Wells Club of Hartford, and his secretary, Miss H. Louise Blair, whose cooperation has been invaluable, advise me that this certificate hangs in the Hartford Dental Library and that the following signatures are also on the original: Joseph T. Clover and N. Woodhouse Braine, Treasurers; Charles James Fox and Edwin Sercomb, Secretaries.

It is of interest that the list of subscribers comprised "the name of nearly every dentist of note, especially in the metropolis; and this list, as showing the recognition by gentlemen of high professional position of the merits of her late husband, cannot but afford gratification to Mrs. Wells; but, however highly such a compliment must be valued, a more tangible evidence of the sincerity of English feeling would not be less appreciated."⁵

AUTHORSHIP OF OLD PAMPHLET CLAIMING WELLS THE DISCOVERER OF ANESTHESIA ESTABLISHED⁶

Discovery by the late Dr. Horace Wells of the Applicability of Nitrous Oxyd Gas, Sulphuric Ether and Other Vapors in Surgical Operations, Nearly Two Years Before the Patented Discovery of Drs. Charles T. Jackson and W. T. Morton (Press of Case, Tiffany & Co., Hartford, 1850) is one of the most powerfully written pamphlets in existence presenting Horace Wells' case as the true

⁵From notices which appeared in the *British Journal of Dental Science* (16: 115, 391, March, 1873.)

⁶These items are deemed of definitely significant value in establishment of Wells' position in this matter and are reprinted from *Dental Rays*, 14, 71; 1939 (March).

discoverer of anesthesia. Yet this pamphlet, which contains many affidavits from leading dentists, physicians, and citizens of Hartford, carries no author's name. The Congressional Library card attributes the authorship to J. Wales, citing as authority Richard Manning Hodges, who, in the bibliography of his *Narrative of Events Connected With the Introduction of Sulphuric Ether Into Surgical Use*,⁷ thus credits the authorship.

On a visit to the Connecticut Historical Society in Hartford, to investigate their collection of material dealing with the discovery of anesthesia, the librarian placed before me, among other items, a large Manila envelope on which was written in what is said to be the handwriting of Charles T. Wells (the son and only child of Horace Wells), the following: "Chas. T. Wells, Ms of Pamphlet by Isaac Toucey" (Fig. 1). The name Toucey was a strange one, one which I had never seen on any documents supporting Wells. Hence it was with considerable surprise when on opening the envelope the original manuscript of the well-known pamphlet mentioned in the opening paragraph of this article was discovered (Fig. 2).

On acquainting Dr. Max E. Soifer, Librarian of the Hartford Dental Society, with this find, he offered to attempt to identify Isaac Toucey. Subsequently, he advised me that I would find complete information concerning Isaac Toucey in Frederick C. Norton's "The Governors of Connecticut, 1635 to 1905." Albert C. Bates, Librarian of the Connecticut Historical Society, very kindly had the following information photostated from the book:

Isaac Toucey was born in Newton on November 5, 1796, and was a descendant of Rev. Thomas Toucey, the first Congregational minister of the town. He received a good education, but never attended college, as he commenced studying law with the Hon. Asa Chapman of Newton, who was afterwards judge of the Supreme Court of Errors.

⁷This book by Dr. Hodges, a former surgeon of the Massachusetts General Hospital, was published by Little, Brown and Company of Boston in 1891. It contains a history of the use of ether in surgical practice, an Appendix dealing with the "operations at Massachusetts General Hospital between October 18 and December 31, 1846," which includes those in which ether was used and also a Bibliography which is "a fairly thorough enumeration of all the important literature bearing on the History of Surgical Anaesthesia, and especially of the Ether controversy."

In 1818, at the age of twenty-two years, Toucey was admitted to the bar in Hartford and began practice in that city. Possessing an unusual knowledge of the law for so young a man and being untiring for his clients' interests, Toucey soon gained prominence and secured a large and lucrative practice. Four years after being admitted to the bar he was chosen state's attorney for

Hartford County, which office he held for the next thirteen years.

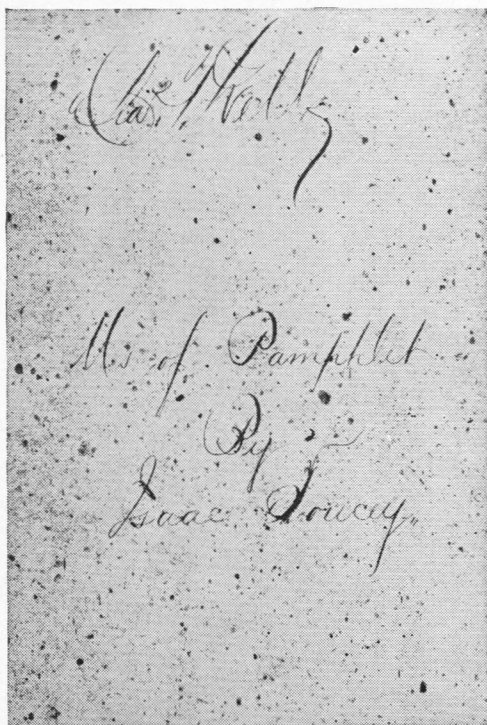


FIG. 1—THE ENVELOPE IN WHICH MANUSCRIPT WAS FOUND. THE HANDWRITING IS THAT OF CHARLES T. WELLS.

In 1835 Toucey became the choice of his party for representative in Congress, and was elected to that position during the year. Toucey remained in Congress four years, retiring in 1839, with an honorable record of service. He was elected governor of Connecticut in 1846, and remained in office one year. At this time Governor Toucey was considered to be one of the ablest lawyers in Connecticut and his fame reached far outside of the state.

President Polk appointed Governor Toucey attorney-general of the United States, and he served as such from June 21, 1848, to March 3, 1849. During a portion of this period Toucey was acting secretary of state. After retiring from the office of attorney-general Toucey returned to Connecticut and

was elected a member of the United States Senate, and held the office during the full term of six years.

When James Buchanan was inaugurated President on March 4, 1847 [incorrect, should be 1857] Isaac Toucey was named as secretary of the navy to succeed the Hon. James C. Dobbins of North Carolina. Commencing his duties as the head of the navy department March 6, 1857, Toucey served throughout the administration, retiring from office March 3, 1861. . . .

. . . Governor Toucey returned to this state and resumed the practice of

his profession, to which he was intensely devoted. Several offices were offered to him at this period; among these was a place on the bench of the United States Supreme Court.

Living at Hartford the remaining years of his life, he was the recipient of many honors at the hands of his fellow townsmen. He died on July 30, 1869, aged 73 years.

Of his professional ability the "Judicial and Civil History of Connecticut" says: "He justly ranked among the ablest lawyers in the state. He was a very accurate lawyer, learned and exact in pleading, and clear and orderly in the presentation of his case."

The same article continues, in referring to his personal characteristics: "He was tall in person, and though of slender figure, he had fine features and a commanding presence. He spoke slowly, but with great precision. His diction was strong and clear, but without a particle of ornament. His private character was without a stain. He was a consistent and devout member of the Episcopal church. In his convictions he was firm, and held to them with a strength and tenacity of will that were never surpassed. His self-possession never forsook him, and on all occasions he exhibited the bearing of a high-toned gentleman."

Isaac Toucey, it would seem, was an important figure in the affairs of his state and country, and certainly in the affairs of his city—Hartford—and his opinions and writings naturally would be of value. Therefore, if it could be established that Toucey was the author of this manuscript crediting Wells with the discovery of anesthesia, another strong supporting argument in the controversy concerning Wells' place in this event could be advanced.

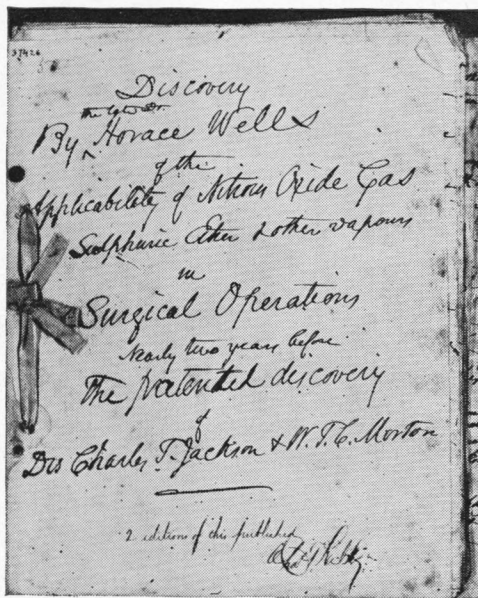


FIG. 2—TITLE-PAGE OF MANUSCRIPT.

My dear Mrs. Sigourney

I had the pleasure
to receive your Christmas gift
by the hand of Miss Dixon.

A beautiful volume of
illustrated poems, just from the
press, as a gift from the favorite
poetess herself, whose wide-spread
fame has in it an enduring
monument, & no slight favor.

Accept my acknowledgments
for the compliment so gracefully
bestowed, & believe me,
dear lady

Truly yours

with perfect
esteem & regard

I. Toucey

Washington Dec 27th 1848

FIG. 3 — A LETTER WRITTEN BY
ISAAC TOUCEY TO THE POET, MRS.
SIGOURNEY.

FIG. 4 — THE SECOND PAGE OF
THE MANUSCRIPT. THE SIM-
ILARITY OF THIS HANDWRITING
WITH THAT OF TOUCEY'S (see
above) CAN BE NOTED EASILY.

2
In the latter part of the year 1844
it is not known, that by the inhalation
of a substance the body can be rendered
insensible to pain under surgical operations,
without injury to the patient. No one, it is believed,
claims the honor of a previous discovery in
the ordinary sense of that term. No one
before that time had ascertained the fact
by actual experiment. We say this in full
view of the claims set up by Dr. Charles D.
Jackson of the City of Boston, because it is
not pretended by him, or by any one for him,
that he ever performed a surgical operation,
or caused one to be performed upon a subject
under the influence of sulphuric ether, until
that, (the merit of which he claims) performed
by the hand of Dr. W. J. G. Morton on the
30th day of September 1846, nearly two years
after the period of which we are now
speaking. If we admit that as early as
the winter of 1841-42, when he inhaled the
vapor of sulphuric ether as a remedy for the
effects of chlorine gas, "he was ++ led to believe"
as he now says "that the paralysis of the nerves
of sensation was so great during the continuance

The one way of establishing the authorship beyond doubt, would be to compare Toucey's handwriting with the handwriting of the manuscript in question. This has been done (Figs. 3-4). I obtained a copy of a letter by Toucey (written when he was attorney-general of the United States to the poet, Mrs. Sigourney) and have had this compared with the pamphlet in question by several handwriting experts. They were all of *the opinion* that the two specimens were written by the same hand. However, since the original documents were not available in Pittsburgh, and these handwriting analysts could study the photostatic copies only, a written statement could not be obtained from them.⁸

The fact that Toucey was the author is supported further by finding the original manuscript still extant and *contained* in an envelope on which Wells' son has written "Ms. of Pamphlet by Isaac Toucey." Also, it is noted that Wells' son has written "2 editions of this published" on the title page (Fig. 2). He must have known Toucey to be the author.

It would seem then, in view of these facts, that the pamphlet in question which definitely indicates that Wells was the discoverer of anesthesia, was written by Isaac Toucey—a man whose character, ability, training, and general information, show him to be a proponent of truth and fairness. The statements and opinions of Toucey, therefore, are of value, and carry weight. What he has said of Wells deserves consideration by all those interested in seeing the name of Horace Wells given its proper and rightful place in the history of anesthesia.

THREE OTHER ANONYMOUS PAMPHLETS SUPPORTING HORACE WELLS' RIGHT TO BE CALLED DISCOVERER OF ANESTHESIA

In the "Wellsiana" of the library of the School of Dentistry of the University of Pittsburgh there are four anonymous pamphlets supporting Horace Wells' right to the title Discoverer of Anesthesia.

⁸The photostatic copies of the original manuscript and the letter by Toucey were made available through the kindness of Albert C. Bates, Librarian of the Connecticut Historical Society.

The first one published in 1850 has just been discussed and the authorship has been ascribed to Isaac Toucey.

The second pamphlet is titled *Dr. Wells, the Discoverer of Anesthesia*. It was published in New York by J. A. Gray, Printer and Stereotyper, 16 and 18 Jacob Street, in 1860. It contains an engraving of Horace Wells with his reproduced signature. There is also an inserted letter by Elizabeth Wells which reads as follows:

Hartford, April 1860.

Sir,

As the widow of Dr. Horace Wells I beg leave to address you. The discovery which my husband made and which has so largely benefited mankind has been to his family only a source of bitter misfortune. The experiments which he constantly made upon himself terminated fatally and he died in fear and despair that the fame due him would not be accorded after his death.

The only inheritance which Horace Wells has left is the reputation which he had earned as a benefactor of mankind and my highest ambition is to leave this unquestioned before the world.

In pursuance of this object it is my intention to bring this subject before the Medical Convention to be held at New Haven during the coming summer. I feel assured that there at least I shall have a full and patient hearing and that my husband's brother physicians will deliberate well before they forsake a just cause when it is that of the widow and orphan. Although it may now be too late to do anything but justice to my husband's memory, I pray that at least this may be accomplished and that the evidence that he is the true discoverer may be endorsed by the Medical Convention.

To this end let me beg you to give some attention to the evidence which will be forwarded to you. It has been prepared by the friends of a helpless woman whose duty it is to redeem the memory of a good man and rescue the credit of his discovery from the grasp of men who presuming upon his sensitive nature and afterwards upon my helpless widowhood have laid claim to a discovery which I know belongs to my husband alone.

Yours respectfully,

ELIZABETH WELLS.

In Toucey's 1850 pamphlet the date of the first operation is not definitely fixed. We read on page 7, "He (Dr. Riggs) says that about the first of November, 1844, he was consulted by Dr. Wells on this subject; that it was thereupon agreed to make a trial on the

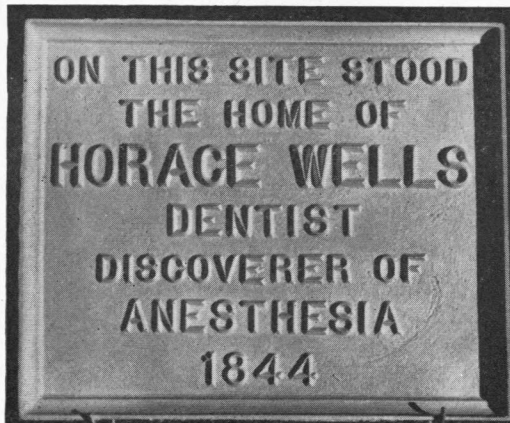
following day; that accordingly on the next day, he administered to Dr. Wells the protoxyd of nitrogen, at his request, and extracted one of his superior molar teeth, he manifested no signs of suffering and stating that he felt no pain during the operation."

In this second pamphlet the date of the first operation on Horace Wells is stated on page 5 to be *September 11, 1844*. The third pamphlet carries the same title, "Dr. Wells, the Discoverer of Anesthesia," but was published in New York by Robert Larter, Printer and Stereotyper, 44 Ann Street, in 1864.

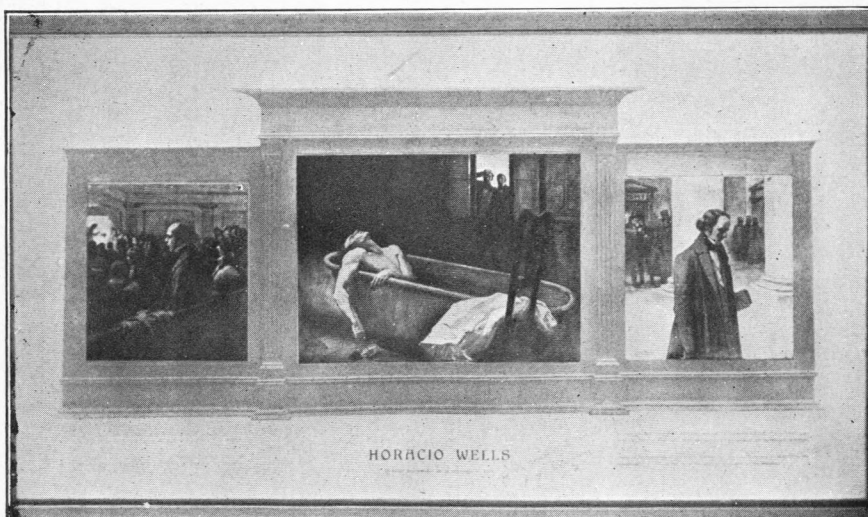
It is the same as the 1860 pamphlet, except the engraved picture of Horace Wells is by H. B. Hall (see picture on page 155, Vol. 2, No. 2, 1944), and Mrs. Wells' letter is not inserted. The date given for the first operation is still *September 11, 1844*.

The fourth pamphlet⁹ carries the same title as the 1860 and 1864 pamphlets, but was published in Hartford by Case, Lockwood and Brainard, Printers, in 1870. It is the same as the 1864 pamphlet, except that the date of the first operation is now correctly given as *December 11, 1844*.

⁹The authorship of this pamphlet has not as yet been established. My guess is that the author was Joseph Wales, brother of Horace Wells' wife, Elizabeth.



PLAQUE MARKING SPOT WHERE HORACE WELLS HAD HIS HOME IN HARTFORD. PLACED DEC. 11, 1944.



This painting, purporting to show the three most tragic episodes in Horace Wells' life, was presented by Prof. Matas Luis Subirana of Madrid, Spain, to Hartford Medical Society, Hartford, Connecticut.

The picture on the left shows Horace Wells at Gardner Q. Colton's exhibition, where the idea of inhalation anaesthesia with nitrous oxide to allay surgical pain was born in Horace Wells' mind.

On the right, Dr. Wells is shown dejectedly leaving the lecture hall at Harvard, where he had made his first public lecture on the use of nitrous oxide to relieve the pain of surgery, and gave his unsuccessful demonstration on a patient before the medical students of that school.

In the center is the incorrect portrayal of his death.

* * * * *

Under the center heading, Horacio Wells, appears the phrase: "Dentista descubridor de la anestesia en 1844".

Under the two outside panels appears the same paragraph in four different languages, as follows:

Left panel—

Reproducción reducida del triptico que por encargo de D. Luis Subirana pintó el laureado artista C. Pla sobre la vida del glorioso descubridor de la anestesia.

Reproduction réduite du triptique que, sur commande de M. Subirana, a été peint par l'artiste diplômé Cecilio Plá, sur la vie de l'inventeur de l'anesthésie.

Right panel—

Verkleinerte Abbildung des Triptikums, welches der bekannte Maler C. Plá für Herrn Luis Subirana, Madrid, über das Leben des berühmten Entdeckers der Anaesthetie anfertigte.

Reduced reproduction of the triptic painted for Dr. Luis Subirana of Madrid by the famous artist C. Plá on the life of the glorious discoverer of anesthesia.

In extremely small print under the right panel: Imp. Art. José Blass Y Cia, San Mateo, 1, Madrid.

Center picture bears the artist's name and date as follows: Cecilio Plá

1908

ST. APOLLONIA^{1a}

PATRONESS OF DENTISTRY

CHARLES DONALD O'MALLEY, M.A., PH.D.

J. B. DE C. M. SAUNDERS, F.R.C.S., (ED.)

The following article on St. Apollonia is the outcome of a project which had its inception at the Regents' meeting in Houston, 1941. The editor believes that a brief statement of its development would not be without interest to the reader and, in addition, is desirous of expressing on behalf of himself and the authors, grateful acknowledgment to those who have contributed to the final production.

The subject had been a matter of correspondence between Dr. J. Ben Robinson, Dean of the Baltimore College of Dental Surgery, University of Maryland, and Dr. F. C. Waite, Western Reserve University. (Dr. Waite will be remembered as a member of the Dental Education Council of America, in the years around and prior to 1922.) Dr. Robinson's interest lay principally in the historical relationship of St. Apollonia and her sainthood to dental medicine; an interest shared by Dr. Waite, who in addition, has extensively pursued the hagiologic and literary aspects of the subject. There is much of value in the latter approach, which, as it scarcely bears directly on professional relationships, the authors had thought should be omitted. Dr. Waite will recognize at once the nature of these omissions, nevertheless we are grateful to him for his study and the subject matter submitted has been most helpful. We are particularly indebted to him for the photostats of the poem by BAPTISTA MANTUANUS and its translation. The OPERA OMNIA of this typical Renaissance poet, euphemistically claimed as the peer of VIRGIL, was first printed at Bologna in 1502 and this edition is of great rarity; the only copy known in the United States being that possessed by the Harvard University library. It was from this copy that Dr. Waite had the skillful translation, amounting to some 7,000 words, prepared by Dr. Scullian of the Classics department of Western Reserve University, and from this translation the authors have drawn extensively.

Acknowledgment is also made to Dr. E. G. Meisel, then a Regent, and to Dr. W. N. Hodgkin, Chairman, History Committee, all of whom have made helpful suggestions.

Prior to the final study, the question was taken up with the Rev. Joseph W. Schechtel, S.J., Librarian at the University of San Francisco. Father Schechtel is a brilliant young student to whom we are grateful for 'A few

^{1a}From the Division of Medical History and Bibliography and the Division of Anatomy, University of California Medical School, San Francisco, California.



ST. APOLLONIA, BY MARTIN DE VOS, FROM AN OLD COLLECTION OF 18 PLATES ENGRAVED BY AEGIDIUS SADELER ABOUT 1800. ALTHOUGH THERE ARE NUMEROUS REPRESENTATIONS OF ST. APOLLONIA, AND MANY OF GREATER ARTISTIC MERIT, THAT OF DE VOS HAS BEEN SELECTED AS PORTRAYING THE SAINT MOST FAITHFULLY IN TERMS OF THE EUSEBIUS ACCOUNT. THE MARTYR IS SHOWN AS AN ELDERLY WOMAN, HER FEATURES IN AGONY. AT HER FEET ARE THE SYMBOLS OF HER MARTYRDOM; SEVERAL TEETH, THE FORCEPS, A SCOURGE AND THE GOSPELS. IN THE BACKGROUND, THE PYRE, THE SOLDIERS OF DECIUS, AND THE SAINT, GRAPHICALLY ENACT THE CIRCUMSTANCES OF HER FINAL CONSUMMATION.

notes on St. Apollonia and Baptista Mantuanus.' It was his desire that these notes should be helpful in this study and that recognition only be made. This recognition is warmly given and with deep appreciation.

Dr. Charles Donald O'Malley, a Historian and Research Associate in the Division of Medical History and Bibliography of the University of California Medical School, together with Dr. Saunders, Professor of Anatomy and Chairman of the Division of Medical History, has been responsible for the completion of this study.—Ed.

The language of symbolism is perhaps the most ancient of all modes of expressing, in its imagery, abstract thought. The psychological significance of such conscious symbolism is very great, since the process endows the idea, appealing to the intellect rather than to the passions, with all the instinctive energy called forth by the emotional tone attached to the symbolic object. "Be ye therefore wise as serpents, and harmless as doves" (*Matthew*, X:16), a phrase in which we find the greater emotional significance of the serpent has enhanced, coloured, and strengthened the colder abstract conception of wisdom, and the perfection of the whole by the contrast of the second symbol. The emotional drive attached to the concept of nationalism in the symbolism of a country's flag, is obvious enough.

In the Middle Ages symbolism attained such a degree of conventionalism as to constitute among the people, the great majority of whom were unlettered, almost a universal method of abstract expression of their faith, their hopes, and their spiritual beliefs. It should not be forgotten that the national state and all that it entails, had not yet emerged, and that the minds of men were centered in the spiritual and the transcendental. At this time the various guilds adopted the martyrs of the Christian faith as the symbols of their occupations and, through their very real spiritual significance, as their patron saints: an important stage, not difficult to understand, in the cultural and intellectual development of civilization. And so, doubly significant in its very antithesis, St. Sebastian, who suffered martyrdom at the hands of the archers, became the patron of the fletchers guild.

It is by such a translation that St. Apollonia became the patroness of dentistry. Actually some nineteen saints have been venerated by those seeking relief from dental pains, but St. Apollonia and St.

Peter [June 29¹] are foremost among the Christian saints as healers of dental aches.² In the case of the latter saint there are numerous prayers alluding to St. Peter's toothache cured by the Lord. St. Agatha [February 5], whose martyrdom consisted of tearing out her breasts with a pair of tongs, which hence constitute an attribute of her sanctity, is occasionally mistaken for St. Apollonia because of the latter's representation with forceps, and invoked in cases of toothache. In England St. Lucy³ [December 13] is invoked while in the German parts of Bohemia, St. Anna⁴ [1204-1246] is called upon.

The only historically acceptable account of St. Apollonia is that related by Dionysius, bishop of Alexandria, [247-265] in a letter to Fabius, then bishop of Antioch. This is known to us from an extract given by Eusebius.

By the middle of the third century the Christian church had gained such a flourishing condition that its members had ceased their earlier attitude of withdrawal from temporal affairs in favor of the kingdom of heaven, and were now taking an active part in society. However, their attitude toward the cults of the state was still officially treason, and they appeared to some of the emperors as a threat to the solidity of the empire. The result was that certain of the emperors sought to stamp out Christianity as a means of restoring religious and political harmony among their subjects. It was under these conditions that Decius in 250 A. D. reversed the tolerant policy of Septimius Severus and ordered Christians to be sought out and brought to trial⁵. This is the setting for the account of Dionysius, now related by Eusebius.

¹All references to St. Apollonia and other saints, unless otherwise specified, have been taken from the Paris edition of the *Acta sanctorum*, edited by C. de Smedt and others. This is arranged according to saints' days, although there is an index to the volumes January to October in vol. 62.

²Cf. Leo Kanner, "The teeth of gods, saints and kings. Mythological and historical contributions to dental folklore", *Medical life*, XXXVIII (1931), p. 511-12.

³Cf. S. Baring-Gould, *Lives of the saints* (Edinburgh, 1914).

⁴Agnes Dunbar, *A dictionary of saintly women*, I (London, 1904), p. 469-70.

⁵Henry Melvill Gwatkin, *Early church to A. D. 313*, II (London, 1909), p. 250ff.

"Moreover, they seized then that marvellous aged virgin Apollonia, and broke out all her teeth with blows on her jaws, and piling up a pyre before the city threatened to burn her alive, if she refused to recite along with them their blasphemous sayings. But she asked for a brief space, and, being released, without flinching, she leaped into the fire and was consumed."⁶

This is the extent of our factual knowledge of St. Apollonia, today venerated as a saint by the Roman Catholic Church.⁷

Throughout the middle ages and the renaissance many versions of the story of St. Apollonia's martyrdom were written. As may readily be imagined, time, credulity and an absence of authentic texts led to such distortions that we may well speak of the "legend" of St. Apollonia. In some instances a process of rejuvenation finally resulted in the representation of the saint as a young maiden.

The martyrology of Jerome, one of the earliest of such accounts, gives but the merest mention of the *passio Apollonis*,⁸ but later accounts, based on the report of Eusebius, are more extended, as, for example, the ninth century martyrology attributed to Bede⁹, and

⁶Eusebius. *The ecclesiastical history with an English translation* by J. E. L. Oulton, II (London, 1932), p. 103. Rufinus, c. 345-410, translator and continuator of Eusebius, wrote, "the cruel authors were terrified when the woman had found death more swiftly than the persecutors, the penalty". There are three other saints who likewise had their teeth either extracted or knocked out: St. Febronia (June 25), St. Hyacinth (July 12), and St. Charitina (October 5).

⁷The feast of St. Apollonia is celebrated on February 9 on the *Roman calendar*, which we find also in the *Roman missal* and the *Roman breviary*, the official liturgical books of the church. That she appears there requires that the whole church venerate her on her feast day in both the Mass and the Divine Office. There was a church dedicated to the saint at Rome, but it no longer exists. The little square, however, in which it stood is still called "Piazza Sant' Apollonia", *Catholic encyclopedia*, I (New York, 1913), p. 617. Later legend assigned a similar martyrdom to an Apollonia, a Christian virgin of Rome in the reign of Julian the Apostate. There is, however, but one martyr recognized under this name, that is, the saint of Alexandria.

In the cases of those who voluntarily sought martyrdom there was the question of whether or not this constituted the sin of suicide. Augustine, *De civitate dei*, i, 26, while not completely reassuring on this point, suggested that possibly these martyrs were acting on the command of God. In the specific case of St. Apollonia, it was concluded by Leonhard Lessius, the sixteenth century Jesuit theologian, that "Either she had done this, instigated by a special afflatus of the Holy Spirit, or without blame she was unaware that this was opposed to the laws of nature."

⁸Migne, *Patrologia latina*, XXX, col. 457.

⁹*Ibidem*, XCIV, col. 838.

those of Usuard,¹⁰ [c. 875], Ado,¹¹ [d. 875] and Notker,¹² [896]. Succeeding ages produced numerous brief accounts such as are to be found in the thirteenth century *Golden Legend*¹³ and the *Speculum historiale*¹⁴ of Vincent of Beauvais down to Girolamo Razzi's *Delle Vite delle donne illustri per santità*¹⁵ and Baronius's *Annales*.¹⁶ There is a succession of manuscript martyrologies extending to the Roman martyrology first printed at Rome in 1583. The third edition, which appeared in 1584, was approved by Gregory XIII, who imposed it upon the whole church.¹⁷

In the Strasburg breviary of 1478 the "Blessed Virgin and Martyr Apollonia" is of "noble family" and "of youthful age". In the Utrecht breviary of 1508 she is "arisen from a noble family of Alexandria". Moreover, summoned by her persecutors before the idols, she blew upon them, whereupon, struck by her breath they were shattered. In retaliation her teeth were knocked out with pointed stones. While in prison she prayed for all sufferers from toothache who would appeal to her, and "a voice from heaven, saying: 'O bride of Christ, you have obtained that which you sought' ". The St. Omer breviary of 1518 makes her not only of noble family, but sufficiently important to have her case presented to the emperor. The Portuguese breviary of Evora, 1548, has her dedicated to God from infancy. Here her teeth are forcibly extracted, but this causes her not pain but exaltation. The saint is also to be found in the Colbertine breviary, compiled especially for the use of the family of Colbert, the great French minister of finance.¹⁸

¹⁰*Ibidem*, CXXIII, coll. 745-46.

¹¹*Ibidem*, col. 123.

¹²*Ibidem*, CXXXI, col. 1044.

¹³*Jacobi a Voragine legenda aurea, recensuit Th. Graesse, ed. 2* (Leipzig, 1850), p. 293f.

¹⁴(Strasburg, 1473), lib. II, cap. 38.

¹⁵I (Florence, 1606).

¹⁶II, *Annales ad annum 252*, num. 4.

¹⁷*Martyrologium romanum illustratum* (Paris, 1660), p. 38.

¹⁸Edited by T. R. Gambies-Parry for the Henry Bradshaw Society, I (London, 1912), p. 281.

In addition, one may note the following fifteenth and sixteenth century devotional works: *Qui comincia la historia & leggenda di sancta Apollonia vergine & martyre di christo* (Florence, [c. 1490]) and *La rappresentatione divota di sancta Apollonia vergine e martire* (Florence, [c. 1492]).¹⁹ Possibly a later edition of the same is *La rappresentatione di S. Apollonia vergine e martire. Di nuovo ristampata* (Florence, 1554); two later editions, (Siena, [? 1560]) and (Farnese, 1601). Yet another work is the *Oratione divotissima de la gloriosa & vergine santa Pollonia* ([? 1540]).²⁰

A missal of 1478 gives an example of the position then occupied by St. Apollonia as the intercessor in cases of dental ailment.

*Deus qui beatam Apolloniam gloriosam virginem, et martyrem tuam: que excussionem dentium pro tui nominis fide passa est, in celetibus coronasti tribue quesumus omnibus eius solennia pie colentibus, perpetua pace gaudue: et a dolore dentium.*²¹

[O Lord, you who have awarded the celestial crown to the blessed Apollonia, glorious virgin and martyr to you, and who for faith in your name suffered the striking out of her teeth, grant to all of us who piously observe her festival that we may enjoy enduring peace and freedom from toothache.]

While St. Apollonia is generally thought of as the patroness of dentistry, yet her aid was sometimes sought as well for other afflictions. In the Antwerp breviary of 1496 she was called upon for perils of the mind as well as those of the body. The Mainz breviary of 1495 considered her as an intercessor for pains of the body as well as of the teeth, and the Regensburg breviary of 1506, for pains of the head and of the teeth, as do also those of Spires, Constance, Schleswig, Minden and Osnabruck. The Utrecht breviary mentioned above contains an account of a miracle performed by the saint. "Outside the walls of the city of Prague was a chapel in honor of God and the blessed virgin Apollonia. The Archbishop Ernest, wishing to include the chapel within the circuit of the wall, destroyed that which was outside so that it might be built

¹⁹*Gesamtkatalog*, II (Leipzig, 1926), nos. 2269, 2270.

²⁰*British Museum Catalogue*, sub Apollonia.

²¹*Missale Romanum Mediolani*, 1478, ed. Robert Lippe, II (London, 1907), p. 178.

within. In the course of time, and due to the neglect of the bishop, it fell to pieces and the whole building was forgotten; and the memory of St. Apollonia was forgotten and removed from the devotion of men. However, it occurred that in the course of time the bishop reached the end of his days and behold! All the teeth were struck from his mouth so that not even one was left there. Thus it was plainly apparent that he was punished for having forgotten, as had been the case with all, who ought not to have erased her from their memory".

Despite the fact that the authors of the *Acta sanctorum* are somewhat dubious of the genuine quality of some of the relics of St. Apollonia to be found in European shrines, nevertheless they list them all—an imposing array. Of the most significance to the present theme are the locations of the jaws and teeth, and while some of the churches which contained these relics are no longer extant, yet in Rome today some of the teeth of St. Apollonia are housed in the church of St. Cecilia in Trastevere; part of the jaw and one tooth in the cathedral of Volterra in Tuscany; and teeth in several churches in Bologna. Various other parts of the jaw and teeth are said to be preserved in France, Germany, Spain and Portugal. No doubt such shrines were visited not only at the promptings of devotion but also by those seeking the aid of the saint for relief from dental pains.²²

Of the many accounts of St. Apollonia the most extensive and at the same time the one with the greatest claim to literary merit is that of the "good old Mantuan", fifteenth century poet and Carmelite monk, Baptista Mantuanus.²³ He was born 17 April 1448, the son of Pietro Spagnolo, a Spanish nobleman who had been captured in the naval battle off Gaeta in 1435 when Alfonso V of Aragon had been defeated by the Genoese. Spagnola remained in Mantua, where he rose to high favor with the reigning house,

²²Wolf-bane root is still known in some parts of Europe as the herb of St. Apollonia.

²³A convenient and authoritative biography is to be found in *The eclogues of Baptista Mantuanus*, ed. with introduction and notes by Wilfred P. Mustard (Baltimore, 1911).

and it was there that Baptista was born. According to the poet's own words he was encouraged in his studies by his father and was a pupil of Gregorio Tifernate and of Georgius Merula in Mantua; later he studied philosophy at Padua. About 1465 he entered the Carmelite monastery at Mantua where he successively received more and more important positions until he was elected vicar-general of the Carmelite congregation of Mantua in 1483, a position to which he was later re-elected on five occasions. Finally he was elected General of the entire Carmelite order in 1513, an office which he seems to have held until his death. Such was his importance that in 1515 he was appointed apostolic Legate to arrange peace between Francis I and the Duke of Milan. However, age and infirmity prevented this task, and he died in Mantua, 20 March 1516. He was beatified 17 December 1885.

Baptista was highly regarded in his own age as a man of learning, skilled in Greek and Latin and a student of Hebrew. His writings were exceedingly numerous and such was his fluency and rapidity in composition that he is said to have published more than 55,000 verses. Even before his death a portrait bust of him was set up at Mantua beside one of Virgil, and his works were carried abroad, often by members of his own order and promptly reprinted in many European cities.

Of all his writings the most popular were his *Eclogues*, first printed in 1498 and for two hundred years widely used as a textbook in the schools of England and on the continent, sometimes even at the expense of Virgil; Dr. Johnson related that "the Mantuan was read, at least in some of the inferior schools of this kingdom, to the beginning of the present century".

There were, however, some critics of the poet. The opinion which placed Baptista Mantuanus above Virgil was slyly mocked at in the *Letters of the obscure men*, and in his third idyl, Helius Eobanus Hess declares the inferiority of the later to the earlier Mantuan. Juan Luis Vives calls his poetry facile rather than sublime, while crusty Julius Caesar Scaliger accounts him commonplace.

In 1502 a collected edition of the poetical works was published

at Bologna.²⁴ Included in it are seven poems each entitled *Parthenice*, and all dealing with various saints. It is the fourth of these which concerns us. Actually it deals with two subjects, St. Lucia and St. Apollonia.

Baptista Mantuanus was a renaissance poet, but here, as in many of his other writings, applying himself to a devotional subject. Yet the subject is intrinsically unimportant, the choice resting merely upon the poet's religious inclination. While it is true that renaissance poetic theory could suggest the employment of *doctrina*—a profitable subject matter—yet Baptista's facility in verse-writing suggests that the lives of saints that he wrote were but pegs upon which to exhibit his virtuosity. Nothing new in subject matter is introduced except a display of pagan mythology, certainly not a proper or profitable, subject in a devotional poem. Cicero's *De oratore*, printed as early as 1470 in Italy, had a notable influence upon poetic theory and practice of the age. It emphasized *inventio* and *elocutio*, that is, skill in selection of material which would in turn permit appropriate literary adornment. The emphasis, then, is on style, not substance, or insight.²⁵

So it is that the *Martyrdom of St. Apollonia*, despite its subject

²⁴*Omnia opera Baptistae Mantuani Carmelitae in hoc volumine contenta. Eglogae X. Sylvarum libri VIII. De calamitatibus libri III. Prima Parthenicae Virgo Maria libri III. Secunda Parthenicae beata Chatherina libri III. Tertia Parthenicae Margarita et Agathae Agon liber I. Lucie et Apolloniae Agon liber I. Ludovici Morbioli vita lib. I. Alfonsus pro Rege hispaniae de victoria Granate lib. VI. Tropheum pro gallis expul. pro Duce Mantue lib. V. Ad Falconem libellus in epigrammatis lib. I.* [Colophon:] *Impressum Bononiae per Benedictum Hectoris Calographum accuratissimum aere proprio Anno Salutis M.Dii. Die vero xi. Iunii. Civitatis habenas moderante Dno. Ioanne Bentivolo.* There appears to be but one copy of this first *opera omnia* in this country, a copy in the Harvard library. The British Museum has a separate edition of the following year: *Parthenice tertia Baptistae Mantuani divarum Margarite: Agathes: Lucie: & Apolonie Agonas continens* (Paris, 1503), and the later editions of (Deventer, [?1515]), and (Leipzig, [?1516]).

²⁵Cf. Girolamo Francastoro *Naugerius sive de poetica dialogus* with an English translation by Ruth Kelso and an introduction by Murray W. Bundy, "University of Illinois studies in language and literature, IX, no. 3 (August 1924); D. L. Clark, *Rhetoric and poetry in the renaissance* (New York, 1922); and Charles Sears Baldwin, *Renaissance literary theory and practice*, (New York, 1939).

and the monastic position of its author, is in fact not a devotional poem. Baptista Mantuanus was a representative renaissance literary figure, and as such the classical influence is dominant in his poem. While it is a portrayal of the triumph of Christianity over paganism, yet the narrative is couched in the pagan classical form and adorned with pagan mythology.

The poem written in hexameters, opens with a consideration of the imperial opponents of Christianity: "haughty Nero, born of the progeny of Aeneas"; "Titus, . . . snatched away at length to the Stygian shades"; Trajan, Verus, Mamiminus. Finally, "the time of Decius, that period which filled heaven with splendid souls, when the palace of the Thunderer was often entered and cities grew in the celestial fields".

While under the Emperor Decius, Stygian Pluto, of the race of Saturn, was ruling this toiling world, the gods who have zeal for crimes came together in frequent assemblies: Venus, wise and learned beyond others, and in command of the fickle years of youth; that former workman of the gods whose name was Vulcan; Cyllenian Hermes, strong in cleverness and talk; the great mother of the harvests, once worshipped by the residents of Eleusis; Aeolus and Tethys, and Cupid with his bright face; you also whom the ancient Greeks called twice-mothered Bacchus; the Bacchantes with their hair flowing down their backs, the Maenads and Satyrs along with you, and the swelling crowd of the Bassarides, whose duty it is to tempt those who imbibe and to incite thirst and rouse love with their drink.

The gods having assembled in a cave near Carthage—which location permits mention of Aeneas and Dido—discuss ways and means of regaining control of religion which has been wrested from them by Christianity.

It is the inactivity of the gods, says Venus, that has led to their being overwhelmed by Christianity.

Go, all of you, go, says Venus, while opportunity knocks: go, assail the magistrates and Decius by night, and devise dreams of fitting shape, myself among the first, for they think me the mother of the Romans (at which we've all laughed more than once), and Vesta, who dreads the nuptial chambers, and Quirinus with his father, and all the other deities and tutelary divinities of Rome whom it is right for no impious mortal to hear. Pretend, as if sorrowing over the present disturbance, to complain of many things and

to blame the ungrateful Latins for much, to promise much in return for devotion and to threaten many things as a penalty for wickedness, that they may restore all the gods to their full power and long to revere once more in the ancient manner the traditional rites and temples of the gods and put Christ to flight from the world.

Such is the plan that is put into operation, and nine days later the priests and augurs present themselves to Decius to tell him the forebodings of their dreams and "to commend the native gods and ancestral divinities which Father Aeneas brought with him to Italy after the destruction of Troy, who founded the walls of Rome, and with whom as leaders, the Romans tamed the world". Decius is scarcely able to control his rage against the new religion. All Christians are ordered to be dragged to the Roman images, and when they refuse to perform the rites, to be cast into chains, crucified, cut to pieces, banished, burned and plunged into the sea. The order is broadcast throughout the empire and "finally to the stagnant fields of the Nile and the land of Memphis, where are the ancient kingdoms of the gods."

Here there dwelt, as the story goes, a maiden descended from ancestral kings, Apollonia, outstanding in beauty among the Nile-nurtured daughters, distinguished for the glorious deeds of her forefathers, and reared in great wealth; she was eminent in pure reputation, learned in the new rites, and confessed a man her Saviour and Lord from her earliest years. A virgin she was, who had never and would never suffer the touch of a man, intending to keep her honor everlasting for the mighty Thunderer.

Self-denying in all respects, the perfect example of the devout early Christian, Apollonia led a life of meditation, divorced from all things temporal. But all is changed by the arrival of the emperor's emissary.

He walks filled with the haughtiness of Jove, and casts his eyes over the Pellaean crowd with lofty expression, like a war-horse when he walks over the Thracian fields fitting the pace to that of his master, and with dread voice he orders that his followers drive the people with loud-sounding clash, and urge them on to the temples of the gods, that Christians be called enemies of the Roman name if they deny to the Thunderer the sacred rites, and that if they refuse, they must burn in a fiery furnace.

Apollonia's constancy makes her a target for the persecutor.

Behold Apollonia, offspring of kings, laden down with the bloody chains, is driven from her ancestral halls to the sorrow of the house.

She is brought before the judge and straightway the consul, casting upon her his raging eyes, shouted out in fierce fashion and with a dark countenance ordered her to perform the sacred rites.

Endowed with supernal courage Apollonia refuses to "sacrifice to your marble gods, for it is wicked to do so".

When she had spoken thus, the raging consul shouted out, "Beat, beat upon her impious mouth with flint-stones, that she may stop provoking the Roman gods and divinities." There is no delay; the bold attendants lay hold of hard rocks and with hands upraised rush upon the head of the maiden. And when the onlookers see her teeth falling away and the blood running forth, they shout aloud in pity for the noble maiden and make ready with threatening words to use force upon the lictors, scarce enduring that the teeth of the maiden are struck so roughly and that with so great a rush of wickedness an innocent citizen is ruined.

With the threat of insurrection the consul has Apollonia thrust into a dungeon and then seeks the safety of his palace, where he passes the night devising various torments for the recalcitrant Christians, abetted by the pagan gods.

Nothing is enough for his dread hatred, out of so many tortures nothing can satisfy his wrath, nothing equals his bitter rage. And while mad lust drives his thoughts in a circle, he rises and orders that wood be heaped in a mighty pile near the shore of the sea, and soon the maiden is dragged from her dark dungeon to the torture by way of the postern-gate with the walls of the city tightly closed, lest again sedition be aroused as before the bloody act and he lose her.

Now the choice is placed before the maiden.

"Choose now whether to be burned or to pour libations to our gods." She, however, with face lifted up like that of a suppliant delays a little; soon she looks smiling at the flames and with joyful expression says, "Loose the bonds from my feet and remove the heavy chains from my hands, that I may follow the orders of the consul." Then straightway they joyfully release her, thinking that she will hasten to the sacred images. But she, hesitating not at all after she perceives her footsteps free, in rapid course leaps into the lofty flames. Suddenly around her face a rolling wave of fire surges, and her breathing ceases as the blaze is drunk in. But the flames fear to consume her lifeless body; they feel a divine presence at hand, and the blaze flowing around about is content merely to touch as if giving devout kisses to the sacred skin; her form is left unharmed.

It is immediately apparent that Baptista has not followed the only authentic text, that of Eusebius. Legend has been interwoven into his poem in the portrayal of Apollonia as a young maiden of noble family. The stratagems of the pagan gods are the product of his own poetic fancy. While it is obvious, then, that he was cognizant of the legends, it is also clear, and to be regretted, that, except for the destruction of the maiden's teeth during the course of her martyrdom, he chose not to introduce any other bits of legend associating St. Apollonia with the dental profession. However, the poem must be noted, and justly so, as the most elaborate literary portrayal of St. Apollonia and the events of her martyrdom, which in succeeding ages were to grip the imagination of people and finally to portray her in conjunction with the dental art as its patron saint.

At least during historic times, man seems to have sought an association between dentistry in its various phases and some personality, either heroic or supernatural. Hindu mythology presents Siva as the possessor of unusually large and sharp teeth. Hercules is supposed to have had an additional row of teeth as a sign of abnormal strength, and among the Norse pagans the gods Frey and Heimdall are singled out because of some peculiarity of dentition.

Buddha's tooth, said to be preserved in a shrine at Kandy, has been the subject of much oriental veneration and literature. According to Talmudic tradition, Jacob, the patriarch, had teeth of such strength that in moments of wrath he could crush iron plates to powder with them. One of Mohammed's favorite companions, Abdullah, because of his frequent use of the tooth-pick, an instrument advocated by the Prophet, was given the appellation *Al-Miswak* (the tooth-pick).

Among the African tribes the teeth of some of the kings and chieftains are held by their subjects to be very valuable charms in the propitiation of the elements and the production of rain.

One of the earliest bits of dental folk-lore seems to have been the belief that toothache was caused by a worm. This can be traced back to the era of Babylonian civilization, at which time it was

thought the "worm" of toothache could be destroyed with the aid of the god Ea, its ancient enemy.

Psychologically, it appears that man in all ages had need of a personality with which he could associate dental phenomena, not necessarily as an intercessor or source of relief in time of pain, but at least as the heroic or supernatural projection of earthly and human dental phenomena.

In a sense, then, St. Apollonia as the patroness of dentistry is but the fulfillment of this need in Christian times and in Christian lands. The medieval age of faith witnessed the development of innumerable edifying legends, and the accretions of centuries finally resulted in the detailed legend of the saint. At the same time the idea of intercession, so strongly a part of Roman Catholic theology, inevitably led to the belief in St. Apollonia as the intercessor for those suffering from dental ailments. Only one final step was required and she has become patroness and well-wisher of all those employed in the work of alleviating dental troubles.

The art of dentistry, therefore, is fortunate in the possession of such a patron saint. For those of a past age, St. Apollonia is the embodiment and summation of an inherent need for a supernatural manifestation of human dental phenomena and the nature of her martyrdom ensures a sympathetic intercessor. For the present, she represents with changing conceptions, a fitting patroness of spiritual ideals to those among humanity who seek to bring relief to sufferers of dental ills and desire transcendental inspiration. Not only is she representative of a tradition which can be traced back over the millenia but she is herself of distinguished antiquity, one who bears a history and legend which can be so clearly followed and pursued over a period of seventeen centuries.

THE JOURNAL FORUM

THE PROBLEM: CAN WE TEACH ETHICS?

Conducted by HARLAN H. HORNER¹
Chicago

Our generation has been marked by a very distinct advance in the ethical standards of all professions. Gradually the distinction between a profession and a trade has influenced the professions in the formulation of codes of behavior and ethical conduct. That distinction was voiced in a memorable address at the Convocation of the University of the State of New York in 1914 by Professor George Herbert Palmer of Harvard University. The subject of the address was "Trades and Professions." It was later published in pamphlet form by the Houghton Mifflin Company.

Strictly speaking, he said, "every professional man is engaged in his work for the fun of the thing." He said Harvard College paid him for doing what he would gladly pay her for allowing him to do, so much did he love to practice the delicate art of impartation. The compensation of the professional man, he said, is measured by his *inner outgo*, not like the tradesman's, by his *external income*.

The ideal, Professor Palmer emphasized, works its way into all professions. It was, no doubt, that professional attitude and spirit which prompted the American Dental Association to adopt a Code of Ethics. This code has recently been revised and is observed in practice by the great majority of dentists. It has been found necessary in some states to enact laws to compel observance of the code, particularly as regards advertising.

All of the dental schools of the United States offer instruction in ethics. The question is often raised as to the effectiveness of this instruction and as to the means which may be employed to bring all men to see, without compulsion, the wisdom of the observance of the code of ethics set by their fellows. There is something intolerable in the idea that a professional man must ever be subjected to discipline. Good taste, decent behavior, genuine professional spirit cannot be put on like plaster with a trowel. We must, of course, look first of all to our seats of learning for help and must call upon them to exert every effort to turn out graduates not merely with intellectual fitness and manual skill, but also with a sense of the dignity of their calling and a disposition to uphold it. How far do formal courses in ethics contribute to this end?

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DISCUSSION: WE CAN TEACH ETHICS IF . . .

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We hold these truths to be self-evident, "that all men are created equal; that they are endowed by their Creator with certain unalienable rights, that among these are life, liberty and the pursuit of happiness." In this noble statement, together with the long sentence which follows in the Declaration of Independence, the founding fathers of our great nation proclaimed to the world the fundamental philosophy of all government and of all law. It is our avowed purpose in this terrible war to reestablish these principles and to extend them throughout the world.

Can we teach these same principles to dental students? That, in fact, is the problem involved in the task of teaching dental ethics. We can solve this problem if we can attain a workable unanimity as to what we mean by ethics. Webster defines ethics as "the science of morality." Therefore it is the science of what man ought to do. Now why ought man to do certain acts, and why ought he not to do certain other acts? The answer lies in the source of the obligation implied in the word ought. How is man bound to do certain acts? If the bond arises only out of the agreement of men among themselves, it is obvious that the bond is effective only so long as men allow it to hold them, since honor or decency or self respect or fidelity to one's word would all depend upon the same bond. What man merely voluntarily assumes, he can as voluntarily reject.

The American Dental Association prescribes the *Code of Ethics* "in order that the members may understand more clearly their duties and obligations." If each member does not acknowledge the obligation of practically every item of the Code independently of his membership, the Code is useless. If fidelity to one's word, or honor, does not imply a moral bond which is prior to one's acceptance of membership, obviously this mere acceptance cannot beget any moral obligation. In other words, moral obligation exists independently of man.

This fact ought to be evident to American citizens. It is the principle to which our forefathers appealed when they said "We hold these truths to be self-evident . . . that they are endowed by their Creator with certain unalienable rights."

Section 1 of the Code says "the dentist is charged with many duties and obligations in addition to those set forth herein." Who gives the dentist this charge? These many duties and obligations apparently exist independently

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of the will of the individual dentist. Washington and Jefferson would have said, "It is self-evident that this duty is an unalienable duty from one's Creator as long as one practices dentistry."

The task of making a code of ethics effective among our dental students would be comparatively simple if all Americans today were in agreement with the Declaration of Independence as to the source of moral obligation. Unfortunately there is no such unanimity. In strict logic the problem is impossible of a solution acceptable to all. The statement of the Code in Section I, "Briefly the 'Golden Rule' should be conscientiously applied by every member of the dental profession," seems satisfactory. But conscience is not an automatic calculating machine but rather reason applying the principles of morality or of ethics to one's own actions. If the dentist does not have a grasp of the principles of morality, his conscience cannot guide him with any more reliability than he himself can solve his problems of treatment without a knowledge of dentistry. Yet the situation is not quite as hopeless as the strict logic of the problem implies. Many people are better than their philosophy precisely because few people are consistently logical.

Though many have never heard of the natural law of morality implied in the Declaration of Independence, few if any of our students are devoid of all ethical standards, however innocent they may be of any logical basis for them. Such uncertain norms will not withstand the stress of greed, ambition, economic depression and other inducements to unethical conduct. We can fortify these labile principles by proposing to our students a strictly philosophical basis of ethics.

This is available in the principles of the natural law which was known to the pagan philosophers of Greece and Rome and does not depend upon the Bible or the tenets of any religious denomination. For ethics is the philosophy of human conduct and, as such, derives its principles not from religion but from reason. This is evidenced in the following statement of the natural law from Cicero's speech for Milo; "There exists a genuine absolute law, right reason conformed to nature, universal, unchangeable, eternal, whose voice teaches us the good it commands and turns us from the evil it forbids. To ignore it is to trample under foot one's very nature and to inflict upon one's self by that alone the most cruel punishment, even though one should escape all the chastisements imposed by human justice."

Furthermore, the natural law affords a discriminating standard of good and evil. Man must know not only why and how he is obligated to certain duties but he must also know why certain actions are of obligation; or simply, why some actions are morally good and some morally bad. The natural law reveals the purpose of life without which a discernment of good and evil

is impossible. Good is that which fulfills its purpose, as a watch is good if it keeps time well, the purpose of all watches. I cannot decide whether a life is good or bad if I do not know the purpose of life. As life is made up of acts, individual actions will be good or not in as far as they conform to the purpose of life as a whole. After these two fundamental questions, the source of obligations and the purpose of life, are answered it is comparatively easy to agree upon the more minute details of ethics with their particular application to the profession of dentistry.

CAN WE TEACH ETHICS?

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The University of Kansas City from the first has been committed to the principle that one of its major responsibilities is the fostering of responsible and intelligent citizenship.

Never before in our history has so much concern about education—its nature, its function, its direction—absorbed the attention of the American people. We have built here in our country a vast and complicated and powerful technological age, and we look forward eagerly and hopefully to the ever greater world of science that lies ahead. But the public, no less than the professional educator, pauses to ask himself, What will we do with the machine we have created? Back in the nineteenth century, the wise Emerson observed even then that "Things are in the saddle and ride mankind," and Ruskin admonished us, in another metaphor, that "There is no bread but life." What the American people—indeed, people all over the world—want to know now is whether man is to ride in the saddle, whether the bread of life is to nourish us, whether we are to be the masters or the slaves of the Frankenstein we have created.

The University of Kansas City believes that all individuals, regardless of their later profession or vocation, should be fully prepared in their formal education for the responsibilities of their common citizenship. Lawyers, bankers, physicians, dentists, engineers, journalists, pure scientists, business men should be public servants and intelligent citizens as well as able practitioners of their profession. Each of them is called upon to vote from time to time on questions and policies of general concern. An education that neglects to train them to exercise their voting responsibility wisely or that fails to provide an adequate basis for the most satisfying use of their personal lives is no education at all. If the free society of democracy is to survive, it

¹ President, University of Kansas City.

must have an educational system that will protect and champion its basic principles.

Will formal courses in ethics contribute to this larger conception of our educational responsibility? The answer, I believe, is yes.

Every subject in the curriculum, of course, should be concerned with the ethical and social implications of that subject; in other words, concerned with the effect that subject may have on human welfare. But, over and beyond this, we need an organized study specifically of the history, nature, and implications of the important ethical problems of our times. We need a chart to guide us as we face the practical questions that confront us from day to day.

Such a course should not be too narrowly conceived. If it is taught in a School of Dentistry, for example, it should not be limited solely to the ethics of the dental profession. It should extend to all the major ethical concerns of the dentist not only as a dentist but also as a human being and citizen.

The success of this course, even more than with other courses, depends on the experience, wisdom, and imagination of the teacher. Even a few great teachers in this field could contribute immeasurably to the advancement of the dental profession—could make it, even more than it is today, a powerful force for good in the difficult and crucial years of our century.

CAN WE TEACH ETHICS?

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Epictetus said, "Lose no time in setting before you a certain stamp of character and behavior to observe, both when by yourself and in company with others." This admonition was meant to inspire youth to form good habits of conduct as a means necessary to the achievement of greatest happiness. The recognition by the young dentist of approved ethical standards and his strict observance of these standards in all his professional relationships are just as essential to his success in his life's work as are the acquisition of skills and the mastery of techniques which he will be called upon to demonstrate in the practice of the dental art. The practical value to the dentist of ethical standards is that they provide reliable guides for him to follow in acting rightly in his professional relationships.

The dental student can and should be taught the basic principles of general ethics and how they should be applied to dental situations. Such instruction should advance the student's knowledge of the basic principles of moral philosophy, cultivate his skill in applying these principles to his professional

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conduct, inspire in him high ideals of service and develop in him benevolent attitudes, or good habits of acting with respect to his environment and to his associations. These desirable objectives may be reasonably achieved through a well organized, well administered course of instruction in dental ethics, even in the short period of time usually allotted to the subject in the dental curriculum.

In most dental schools the time allotted to the course in ethics for the dentist is very brief—an average of eight lecture hours. The report of the Curriculum Survey Committee did not designate Dental Ethics as a separate subject in the curriculum, but included it in the suggested course of Practice Management—a wholly unsatisfactory arrangement. If the course in ethics for the dentist is to have a chance to become really useful, it must be made to stand out as an intrinsically important subject in the curriculum and more time than is generally assigned must be allotted for its proper development.

The formal task of teaching Ethics for the Dentist is made more difficult by the fact that only a few students are admitted to the dental curriculum with credits in the field of philosophy, and fewer with credits in general ethics. This lack of basic preparation is common to students on varying levels of academic advancement, ranging from those who have had the minimum two years of college experience to those who have earned the college degree. As a consequence of this lack of experience most dental students are deficient in basic preparation in the science of ethics upon which instruction in ethics for the dentist must be superimposed. Therefore, to teach the application of ethical principles to special situations in dental practice it is necessary to include in the course a brief discussion of the science of ethics.

Unfortunately dentists and dental teachers have regarded the application of dental ethics as of importance only in those cases where there is gross violation of professional decorum, or where there is flagrant abuse of the patient's confidence—such as advertising, price cutting, fee splitting, etc. They are too apt to regard the standard of ethics as mere emphasis on courtesies observed by dentists for the protection of their mutual interests. This attitude is superficial. Dental ethics involves not only the broad interests of the individual dentist in all his relationships, but also those of the patient, the profession and the public. The dental student should be made to realize that ethical standards faithfully observed are a protection and a guarantee to his own best interests, to the security of the profession and to the welfare of society.

It is apparent that if ethics for the dentist is to be taught successfully, the lectures must be divided between suitable emphasis on basic ethical principles and the effective application of these principles to special situations in the various relationships of the dentist. The writer has sought to divide the

eight hours which are allotted to this course in a ratio of three to five—three hours devoted to basic material, and five hours to the practical application of basic principles to dental situations.

The purpose of the first three hours is to develop for the student a vocabulary that will enable him to understand the nature of ethics as a science. This plan of instruction should result in the enlightenment of the student as to the meaning of special terms such as ethics, morals, jurisprudence, behavior, conduct, habit, etc.; it should make him understand that ethics is concerned with conduct conditioned to ends, and that the ultimate end of ethical conduct is the greatest good for himself and for society; it should define the criteria by which good and bad are judged; it should teach that practical ethics is concerned with standards of conduct, and how such conduct is made authoritative. These and related topics if briefly, simply and clearly presented will establish a serviceable foundation upon which a discussion of dental ethics may be superimposed.

The student should understand that ethics constitutes the sanctioned standard of conduct that forms the broad pattern of acceptable professional relationships. He should be taught that the dentist is expected to render a quality service that will contribute to the health and well-being of the patient, and that he must refrain from conscious acts that would injure or tend to injure the patient; also, that the individual dentist should contribute to professional activities and must refrain from acts that will injure the general quality of the profession or lower it in public esteem. If the dentist is to conduct himself ethically as a professional man in meeting all his responsibilities, his standard of ethics must include within its scope his relationships not only to his patients and to his fellow dentists but also to professional literature, to dental organizations, and to his economic and social activities as they relate to the absolute purposes of dentistry.

The student should be made thoroughly conscious of his peculiar responsibilities to society as a professional man. He should be made to realize that the practice of dentistry is to be distinguished from non-professional employment in more than the mere varying conditions of its occupation, the exactness of its science and the expertness of its art of practice. It has a social significance not attained by other kinds of work, which requires that its service be performed with a consciousness that focuses on social welfare rather than on personal profit. Professional service is characterized by the fact that the human element is always present; ethical standards are designed to guarantee that no important human right shall be violated, and to ensure the achievement of an effective, positive professional cooperation. Entrance into a profession is entrance into a specific servanthip, whose deliberate ends are the good that it may contribute to society. Society recognizes this important social

factor by legalizing the various professions through special statutes and thus deliberately creating social monopolies. To commercialize law, medicine, dentistry, or any other learned profession is to violate a public trust. The professional man who puts gain first injures the society which he is supposed to benefit. It is true that there *may* be a large financial return to some members of a profession for efforts expended, but such gain is a fair return for services rendered, and is subordinate to the satisfactions that come from acting well in the interest of society.

It seems highly desirable to impress the dental student with his dual responsibilities—the one, a duty to himself in securing for himself and those dependent on him those material necessities of life that normal human beings naturally want and instinctively strive for; the other, a duty to society of which he is a part, with which he must cooperate in order to achieve his personal ends and from whose social security and economic prosperity he may be sure to derive what is good for himself and his family.

No one can reasonably question the normal urge of young men to enjoy those desirable things of life that their instincts and reason tell them are good, and no one has the right to contest the opportunity of men to derive from their personal efforts those material returns which their industry, talents and skills can legitimately and justly bring them. It is only when the desire for gain is carried to the extreme of unearned profits whereby the confidence of others is betrayed and their health and happiness jeopardized, that self-interest becomes harmful and immoral.

But man must in the very nature of the intricate structure of modern society depend largely upon the cooperation of his fellowmen for many of the good things of life. While one's deeper enjoyments and pleasures must come from his home and his family associations, yet much of the joy he derives from home and family is ensured by those co-workers with whom he associates and with whom he cooperates. Since he hopes to benefit from both society and his profession he must serve both. For instance: the organization of the dental profession is designed to offer opportunities for collective effort that will result in benefit to all members of the group and to society as a whole. If the dentist is to benefit from the advantages provided by an effectively organized profession he can do so only by giving his time and effort to making the profession more useful to society. Assuredly no man has a right to enjoy the advantages that flow from professional organization if he does not contribute as best he can to its greater perfection. The student should be persuaded by the character and quality of instruction in ethics for the dentist that it is his moral obligation to support in every way possible the organizations that make up the professional structure.

A discussion of this important subject would not be complete without ref-

erence to that question most often raised by dental students, namely, the degree to which the dentist should profit from his labors. The student seems to be over-awed by the prevalent insistence in some quarters that *only the service motive* is an appropriate incentive to professional effort. In reality the dentist pursues his labors primarily to make a living. There is nothing immoral in this approach to his task so long as the service aspects of his practice warrant material rewards. There is no conflict between the profit and the service motives when professional conduct conforms to accepted ethical standards. The servant is worthy of his hire; the dentist should be fairly compensated for his time and skill. In his excellent *Remarks on Professional Morality*,² Solyman Brown argued that the dentist should charge for his services in proportion to the charges of other callings, but that he should not overcharge and thus degrade his profession—that is, he should “neither be oppressively high nor meanly low in his professional charges.” Brown argued for “exactitude” in performing all dental operations capably and well, no matter what the circumstances or what the charges might be, and emphasized the thought in these words: “When an individual with respectful confidence surrenders himself to the treatment of the dental operator, he commits to him an important trust with an implied, if not an expressed stipulation, that it shall not be violated.”

Much of the instructor's time in this course must be devoted to a discussion of the relationship of the profit and service motives in order to clarify the thinking of the student with respect to his acknowledged responsibilities to himself and to his patient.

Such a course of lectures aggressively administered will prove that ethics for the dentist *can be taught* because it will succeed in stimulating the development of a rugged professional character—that is, “an effective mental attitude assumed by the individual toward issues of right and wrong in the ethical or moral sense, together with an irresistible feeling to do good.”

²*A.J.D.S.*, First Series, 1:1-9, August, 1839.

In the next issue

THE JOURNAL FORUM

will consider the question,

The Library, an Adjunct to Teaching

THE PHYSICAL FORCES OR PHENOMENA UTILIZED IN THE RETENTION OF DENTURES

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Because of unfavorable conditions such as frail, sharp alveolar ridge formations with but a thin, tender covering of soft tissue, or the absence of alveolar process entirely with loose, flabby tissue falling over the area which must be used as the denture foundation, dentists are frequently faced with very difficult problems in the construction of satisfactory dentures.

Many of them wend their weary way with troubled conscience, eternally seeking that denture heaven where lower dentures, especially, are trouble free. They anxiously subscribe for courses in impression taking, put on by individuals who guarantee 100 per cent results.

These carpet-bag teachers have different theories, each one usually directly opposed to the last. Each insists on some particular impression material and most of them have a very foggy idea of the whole problem of denture construction.

Some of these teachers advocated hinged trays to force the impression material down under the mylohyoid ridge. This system produced dentures which caused more torture to the unfortunate patient than anything devised before or since, so no one now uses those trays. Another advocated very heavy pressure with modeling compound. His system produced an over-extended denture with a temporary "fit" which did not last, and a year later he had shifted to an entirely new technic, a wax impression technic. But neither does this one follow sound theory.

Another course featured a soft wax impression. The dimensions of the finished case resulted more from the amount of wax used than that dictated by the anatomical limitations of the particular mouth. Another used a sharp beading to demonstrate a tight fit before the class, but the poor patient could not put up with this "crown of thorns" and it had to be trimmed off later.

Most all of these technics distort the soft tissues. Some of

them interfered with muscular action and often caused lacerations of the tissue which the patient was supposed to live down. Usually these men were not qualified teachers. They collected a fee, sold trays, etc., commercialized on very limited knowledge and then faded away.

We now have a layman commercializing an impression technique. He claims to have discovered a new principle labeled "mucostatic" and that he is the first to have discovered that denture retention was *not* produced by atmospheric pressure, but by a phenomenon known as "interfacial surface tension."

One of his disciples¹ in an article in the house journal (*Tic*) states, "Atmospheric pressure is *not* the retentive factor of dentures"; and again, "reviewing the available literature on denture retention, we find men who recognized the dubiety of atmospheric pressure in denture retention. Dr. G. H. Wilson in the 1916 edition of his *Denture Prosthesis* was one who expressed his doubts. Harry L. Page was the first to recognize that the agent which produced denture retention was the physical phenomenon known as interfacial surface tension."

Let us keep the record straight by referring to Dr. Wilson's work:²

"By the substitution of this fluid (saliva³), for the film of air the law of hydrostatics is introduced. The law of hydrostatics is, that pressure placed upon a confined liquid is equal in every direction. Therefore, a mechanically perfectly adapted artificial denture having a fluid contact *cannot be retained by atmospheric pressure*, because the intervening fluid equalizes, within and without, the atmospheric pressure."

Dr. Wilson describes the *molecular attraction* in the thin film of fluid between the denture and the tissue which is the chief retentive force, very aptly as "adhesion by contact." Again quoting Dr. Wilson:

"Adhesion by Contact. This retentive force is often confused with atmospheric pressure, whereas it is an entirely different principle. When masses of

¹W. R. Dykins, D.D.S.: *Tic*; 1943, Sept. Published by Ticonium and distributed at the expense of Ticonium Laboratories.

²Dr. G. H. Wilson: *Dental Prosthetics*, 4th edition, chapter VII, p. 318. Published by Lea and Febiger, Philadelphia.

³Not in the original.

matter are brought into mechanical contact and are caused to adhere by a film of non-adhesive fluid, it might be thought that the adhesion is due to the strength of the fluid; but this is not the case because the thinner the film the greater the adhesion. That this adhesion is not due to atmospheric pressure may be demonstrated by suspending two masses of matter adhering by contact in the chamber of an air-pump and exhausting the air, when the adhesion will remain the same or stronger than under normal atmospheric conditions. Therefore, through an understanding of these axioms regarding molecular attraction and repulsion, we can appreciate how artificial dentures are retained by the so-called adhesion by contact."

One weakness of this so-called mucostatic technic is that it depends too much on this principle of contact adhesion and neglects some other principles which are often of great value to the experienced prosthetist. Let us again quote Wilson:

"There is a form of vacuum chamber that may be called the emergency vacuum. It is invisible and exists only during an emergency. It is best illustrated with a full upper denture. It is also efficient in favorable full lower dentures. This emergency vacuum is conditioned upon areal contact, peripheral adaptation and extension upon yieldable soft tissue. In full upper cases the essential extension is the entire length of the palatal border. This palatal border bearing upon yieldable tissue must be approximately one-fourth inch wide and may be much wider. If the labial and buccal flanges are sealed in by the lips and cheeks no air can be admitted at these borders, if the entire maxillary surface has moisture contact there is practically no air within and if the palatal border is well adapted to and extends sufficiently upon yieldable tissue to form the required valve the conditions are perfect to produce the emergency vacuum. There is now no vacuum but molecular attraction; but if force is applied in any manner, that is, downward, sideways or forward the plate will be drawn away (slightly) from a portion of the tensest tissue enclosed thereby producing a, relatively speaking, perfect vacuum (14.7 pounds per square inch) over the entire surface from which the plate is dislodged. This suction will exist so long as the force is applied or until air can gain access to the vacuum space."

Speaking of the use of a vacuum chamber and leverage, Dr. Wilson states:

"These secondary forces may be either positive or negative. Thus atmospheric pressure may be selected as the primary retentive force, but adhesion by contact must be an associate retentive force, whether it be so designed or not, and eventually will entirely take the place of atmospheric pressure in

any given case. The principle of leverage is always associated, through antagonization, with whatever may be the primary method selected. This force especially may be considered as positive when the arrangement of the teeth is such that it tends to force the denture more securely to place, and as negative when the arrangement is such that antagonization tends to loosen the denture."

Another disciple⁴ states:

"It seems evident to me that Mr. Harry Page, the originator of Mucostatics, has presented a wholly practical theory and a method for its application in the construction of prostheses for edentulous mandibles. In a narrow sense, it is unfortunate that this information could not have originated within our own ranks. In a large sense, it matters not whence progress is made, it matters only that it is made. It is neither the first nor the last time that the healing profession will have learned from the uninitiated."

Dr. Addison obviously is not familiar with the work of Drs. Wilson, Richardson and other leaders in the past and present prosthetic field. He is also apparently not familiar with the fact that Drs. Montgomery and Burgess of Los Angeles claim originality for this mucostatic technic and that they presented it to the profession at the meeting of the A. D. A. in Houston, Texas. Later, these gentlemen filed a lawsuit against Page for commercializing on their technic, trays, etc., resulting in a financial settlement, made out of court.

Just what is there to this so-called "mucostatic principle"? It is simply a substitution of the term "interfacial surface tension," for the old and well understood term, "adhesion" or "adhesion by contact," for the molecular attraction in the thin film of saliva between the denture base and the tissues. The sale of impression trays, a technic, and a chromium alloy are, no doubt, important parts.

Turning to Richardson's *Practical Treatise on Mechanical Dentistry*, published in 1886, I quote:

"In all cases where the plate or other base is accurately adapted to the entire mucous surfaces, and the air thoroughly excluded, the essential condition favoring its retention by adhesion is secured, namely, perfect contact of a solid with the fluids with which the mucous surfaces are constantly bathed.

⁴Paul I. Addison: Mucostatic Impressions; *J.A.D.A.*, 31, 941; 1944, July.

. . . The absurdity, therefore, of attributing the retention of substitutes, adapted in this manner to the mouth, to the pressure of the atmosphere is apparent. There can be no reasonable question but that substitutes so applied are held *in situ* by that force manifesting itself in adhesion."

Although the profession is criticized by the proponents of the "mucostatic principle" for harboring the notion, I can find no competent authority who claims that "atmospheric pressure" is the chief agent utilized in denture retention.

We are also severely criticized by them for using the term "tissue compression." This criticism is not new, it has been going on for generations, as indicated in Richardson's text:

"Its (plaster) capability, beyond that of all the other substances mentioned, of securing the most perfect impression of the several parts in their undisturbed relation to each other is unquestioned. . . . It is generally believed that certain forms of impression material, through the pressure they exert, are capable of contributing materially to this result (equilibrium of pressure.) This is predicated on the assumption that the pressure they exert is sufficient to compress or displace the tissues in question. If by the term compression, as used in this connection, is meant condensation or diminished bulk of tissue, certainly no such result could be obtained by any force capable of being applied within the mouth, however hard and resistant the material used. Any change in the normal configuration of the arch and ridges possible in the use of such substances must, therefore, result, not in condensation, but in displacement of tissue . . . That any change in the mere relative position of such loose structures to the ridge would contribute in any appreciable manner to the stability of the substitute is not very apparent."

It might be well to restate and review here the physical phenomena utilized in the retention of dentures:

- | | |
|------------------------|-------------------------|
| 1. Adhesion by contact | 4. Atmospheric pressure |
| 2. Leverage | 5. Gravity |
| 3. Balanced occlusion | |

1. ADHESION BY CONTACT: Adhesion by contact is produced by molecular attraction in the thin film of fluid between the denture and the palate and alveolar ridges. This phenomenon manifests itself in the surface tension exhibited by a drop of water or dew which, contrary to the law of gravity, seeks to assume a spheroidal shape. Also is involved, the molecular attraction of the film of fluid for

the base plate and tissues covered by the base. This force can be observed in a capillary tube where the water creeps up the sides of the tube against the force of gravity.

2. **LEVERAGE:** Leverage has to do with the relation of the teeth to the ridges and also the relation of their occluding surfaces to those of the teeth in the other jaw. The leverage factor is said to be favorable when the dentures during the function of mastication tend to seat themselves securely in place. Its operation is observed while pressure is being applied to the bolus of food before the teeth come in contact. Unfavorable reactions to this desired condition can be produced, for example, by setting the teeth too far from the crest of the ridge in either a horizontal or vertical direction.

3. **BALANCED OCCLUSION:** In balanced occlusion we are concerned with having the teeth contact evenly without cusp interference in centric as well as in the excentric jaw relations.

4. **ATMOSPHERIC PRESSURE:** Atmospheric pressure manifesting itself in emergency vacuum as explained by the authorities previously quoted, is a most desirable factor. However, vacuum chambers and patented suction cups are not recommended as nature will only tolerate a vacuum under a denture for a short period of time.

5. **GRAVITY:** Gravity is a minor factor. It operates against a heavy upper denture which is not sufficiently extended to take advantage of all the foundation available. Inversely it operates favorably in the case of a lower denture.

Another factor as important as any of the physical phenomena utilized in denture retention is seldom mentioned. Reference is made to the muscle coordination unconsciously developed by the denture patient. *No patient obtains the full effectiveness of dentures in function unless he develops this faculty.* It is routinely observed that patients who develop it to a high degree successfully wear dentures which have long since lost their fit, if they ever did fit. We have all observed the upper dentures retained almost entirely by the tongue which are worn successfully by many patients. Lower dentures built with concave surfaces, facing upward in the buccal and disto buccal areas, lend themselves readily to this retention by subconscious muscle action. Slightly concave surfaces on the lingual

flange are also favorable to this retentive factor. Some patients not only tolerate but use large plumpers on the buccal surfaces of lower dentures as a retentive factor.

One of the weak points in the "mucostatic" lower denture is that being cut off at a sharp edge at the periphery and having perpendicular lingual and buccal surfaces, they offer little chance for help from this muscle action which they often sadly need. The lack of proper extension and post-damming in the upper denture causes too great a percentage of failures, even though contact adhesion is much stronger here than in the lower denture. The face saving improvisation of using a sharp beading instead of post-damming fails to make the theory work here, where emergency vacuum and muscle retention are of so much value. The perpendicular labial and buccal flange demanded by the theory fails to produce the esthetic effect which is the very first requirement in any upper denture. It would ruin any dentist who tried to apply it generally.

There is no denying the fact that an accurately fitting metal denture base, lower or upper, is superior to any other. A poor fitting metal base, however, presents a troublesome situation because of the difficulty of correcting it.

A good point in the "mucostatics" technic is that the narrow trays obviate over-extension, a common fault with those who cannot or do not want to spend the time to make an individual tray of the proper dimensions. Another good point is that the narrow tray does extend back including the retro-molar pad, thus avoiding the common mistake of inadequate distal extension of the base.

Depending almost entirely on contact adhesion for retention, the technic requires an accurately fitting metal base for success. The weight, fit and permanence of the metal lower base, however, is an advantage in *any* technic.

Plastic dentures are definitely superior when in addition to contact adhesion other auxiliary factors are taken advantage of, for example, the factor of emergency vacuum which is secured by a careful extension of the periphery of the denture to the soft tissue and by the avoiding of the interference of muscle action. In this type

of denture the principle of auxiliary retention must be used in the great majority of cases.

A rule laid down by Dr. Wilson is that all the foundation area possible should be used for the denture so long as the base does not interfere with normal muscle function.

Much is made of the idea of no pressure being used in this "mucostatic" impression. Since a very soft impression material is used it would not be possible to use pressure as the material would most all squeeze out leaving in effect an impression shaped more like the tray than like the ridge.

Different mouths and impression materials require different handling, and technics should be guided by intelligence; which means that it is often best to vary the technic for the individual case. Again quoting Dr. Wilson: "Some writers would lead one to believe that all lower artificial dentures should have a deep lingual flange, while other writers would have the lingual flange almost entirely removed. Both are partly correct, because some cases require the one treatment and other cases the other method." This theory and practice is just as sound today as it was forty years ago.

It must be understood that equally important as the impression in denture retention, are the factors of leverage, occlusal balance, correct centric and bite opening, and favorable shaping of the flange areas to facilitate retaining aid from the muscles.

Competent authorities have generally agreed that any good impression material must be used when it is in a readily flowing condition. This applies whether the material be plaster of Paris, modeling compound, zinc oxide and oil pastes, or wax and like materials. The all-important requirement is that the operator must familiarize himself with the action of the material being used. Any of these materials when used in a too stiff condition will produce a poor impression.

After thorough study and conscientious effort we find that results in some of the more unfavorable cases are not as perfect as we should like to have them. This should be no cause for discouragement, since due to their adaptability most patients wear these dentures success-

fully. Bearing on this point we again quote from Wilson⁵: "Whoever expects a perfect piece to see, expects that which never was, is, nor can be."

Many of our modern generation of dentists through haste and under the pressure of quantity production, do not give sufficient thought and study to the requirements of the case at hand. We run the cases through without the required variation in technic dictated by the anatomical variations of the individual. Too much reliance is placed on the dental laboratory for the success of the denture.

We should be grateful, therefore, for the work of the old masters who found Dentistry in the barber-shop and developed it into an almost mature profession. But at the same time we should be more than a little concerned by the modern tendency which diverts this important branch of dentistry back into the hands of layman. This trend if continued can result only in a lowering of the standard of denture service to the people.

⁵Dr. G. H. Wilson: *Dental Prosthetics*, 4th edition, p. 345. Published by Lea and Febiger, Philadelphia.

Certaine precepts meet for y Gathered Chiefly out of Guido

I read that Aristotle the wise and grave Philosopher,
Wrote an Epistle, unto noble King Alexander:
Saying, choose your servitors, by their good and comely face,
For such men are most meete, to be about Your Grace.

Of the same opinion, the best learned sure are still,
That the countenance doth betray the manners good or ill.

Therefore saith Guido, you shall in no wise choose
Any such deformed person, Chirurgery to use,
But one that is ingenious, and apt for to devise,
New remedies for new griefes, as daily they do rise.

With a cunning, speedy, handsome handling of the grieve,
By the third part of Physick, procuring safe reliefe,

The things that a good Surgeon, ought chiefly to know
Are naturall, not naturall, against nature also.

Yet they that have learning without practice in the Art,
Do oft more hurt, than helpe, unto the grieved part.

So practice without learning, yee ought not to admit,
These two may not be separate, that are so duly knit.

There must be a dexterity, and finesse in working,
A quick remembrance, and a ready understanding.

He must be circumspect, and seeke to avoide all slaunder,
Not too covetous for mony, but a reasonable demaunder.

Being good unto the pore, let the rich pay therefore,
So God will blesse thy doings, and thou shalt have the more.

He must also be honest, and in living very upright,
To serve the Lord our God, must be his whole delight.

Avoiding of all drunkennesse, and vile riot to detest,
Lest he grow fit for nothin, but Bacchus belly feast.

His fingers must be small, and his hands without quaking,
Stedfast to hold without trembling or shaking.

Young students in Chirurgerie, Gerauliac by William Clowes

Who worketh upon man's body, being unskilful of the same,
Is fitter for the stable, than to cure the sicke or lame.

The patient's lawful secrets, you ought for to conceale,
It is not for a Surgeon's credit things secret to reveale.

Likewise the patient ought to suffer, and duly to observe,
The precepts of his Surgeon, from the which he may not swerve,
Having good trust in him, and a sure hope and confidence,
And touching all the cure, yielding due obedience.

A Surgeon should not take in hand any cure or maladie,
The which is past all helpe, or hope of his recovery.

And he that setteth a day, when his patient shall be cured,
Is but a childish Surgeon, you may be well assured.

Hippocrates in his Aphorisme, as Galen writeth sure,
Saith, foure things are needful to every kinde of cure.

The first, said he, to God belongeth the chiefest part,
The second to the Surgeon, who doth apply the art.

The third unto the medicine, that is dame Nature's friend,
The fourth unto the patient, with whom I heere will end.

How then may a Surgeon appoint a time, day or houre,
When three parts of the cure are quite without his powre?

All these things shuld be observed by Surgeons as their vowes:
I wish we all could follow this, finis William Clowes.

*When valient Mars, with brave and warlike band,
In fourteen field, with sword and shield doth stand.
May there be mist a Surgeon that is good,
To value your wounds, and eke to stay your Blood?*

*To cure you sure he will have watchfull eie,
And with such wights he means to live and die:
So that againe, you must augment his store,
And having this, he will request no more.*

THESE "Precepts" are taken from the second edition of William Clowes' "A Profitable and Necessarie Booke of Observations" (London, 1596, pp. 137-139). Considered the best of Elizabethan military surgeons, Clowes (1540-1604) wrote vigorously in the vernacular, as his couplets show. His "Booke of Observations" deals chiefly with powder burns, gunshot wounds, and syphilis, matters still of grave importance in war medicine. The "Precepts" are really quite original although forming part of a long tradition of similar writings. Perhaps Clowes thought his sturdy iambic heptameters required the support of such a revered surgical authority as Guy de Chauliac whose great *Ars Chirurgica* was written in 1363. This was the standard European surgery, in principles, technique, and instrumentation, until displaced by that of Ambrose Pare (1510-1590). While Clowes refers to his contemporary surgical colleagues, he evidently felt a close tie to Guido!

AMERICAN COLLEGE OF DENTISTS
MINUTES OF THE MEETING OF BOARD OF REGENTS
CHICAGO, ILL., FEB. 11 AND 12, 1945.
(Abbreviated)

O. W. BRANDHORST, D.D.S., *Secretary*

The Board of Regents met in the Stevens Hotel, Chicago, Sunday morning, February 11, 1945, convening at 9:45 o'clock. Vice-President Benson, presiding.

Minutes of meeting of October 18, 1944, approved.

REPORTS OF OFFICERS

Treasurer:—The Treasurer reported that on February 7, 1945, the deposit balance in the Continental Illinois National Bank and Trust Company amounted to \$14,062.75, in addition to securities amounting to \$7,000 (par value).

Secretary:—*Re New Sections*. The Secretary reported that the Kansas City Mid-West Section of the College had been duly formed.

Re Conferring of Fellowships. The Secretary reported that all Sections except those of Wisconsin, Colorado, Oregon, Texas and Kansas City Mid-West, had held meetings in the fall of 1944 for the conferring of Fellowship. Fellowships were conferred upon the following persons:

Leon L. Abbey, Schenectady, N. Y.

Carl W. Adams, U. S. Naval Hospital, Corona, Calif. (In service—Navy.)

Clifford E. Allen, U. S. Navy Planning Division, Bureau of Medicine and Surgery, Washington, D. C. (Navy—Regular.)

Newton E. Allen, Selma, Ala.

Francis A. Arnold, U.S.P.H. Service, Bethesda, Md.

Thomas J. Bland, Baltimore, Md.

Paul E. Bomberger, Lancaster, Pa.

Nash C. Brennan, Shenandoah, Pa.

Arthur H. Bulbulian, Rochester, Minn.

Terry P. Bull (Army—Regular), (Overseas Service).

Lester R. Cahn, New York, N. Y.

Newton M. Campbell, Gary, Ind.

Harve Elliott Cannon, Los Angeles, Calif.

Francis Joseph Conley, Farragut, Idaho. (In Service—Navy.)
David Cooper, U.S.P.H. Service. (Overseas Service.)
Walter William Dalitsch, Chicago, Ill. (In Service—Navy.)
Robert S. Davis (Navy—Regular), Washington, D. C.
Charles Nelson Fiero, Erie, Pa.
George S. Easton, Iowa. (In Service—Army.)
Neal Anthony Harper, Carlisle Barracks, Pa. (Army—Regular.)
Ingolf B. Hauge, Augusta, Ga. (Army—Regular.)
Samuel A. Isaacson, New York, N. Y.
Roy M. Jernall, Minneapolis, Minn.
William P. Kroschel, U.S.P.H. Service. (Overseas Service.)
Claude S. Larned, Battle Creek, Mich.
John J. Lusardi, Jersey City, N. J.
Everett E. MacGibbon, Minneapolis, Minn.
Peter R. MacKinnon, Wollaston, Mass.
Jay P. Marshall, Maplewood, Mo.
Charles P. Mayhall, Harlan, Ky.
James S. Miller U.S.P.H. Service, New York, N. Y.
George Allen Nevitt, U.S.P.H. Service, New York, N. Y.
Edward Joseph Ortion, New York, N. Y.
Ozias Paquin, U.S.P.H. Service, Kirkwood, Mo.
Daniel C. Peavy, San Antonio, Tex.
John F. Prichard, Fort Worth, Tex.
James Leo Purcell, Quonset Point, R. I. (Navy—Regular.)
Frank L. Raasch, Kearney, Neb. (In Service—Army.)
Ernest J. H. Schneider, Maplewood, N. J.
Robert A. Scroggie, U.S.P.H. Service, Norfolk, Va.
Alfred Edward Seyler, Detroit, Mich.
Leo Shonfield, Pittsburgh, Pa.
George Albert Smith, Washington, D. C.
William Sylvester Smith, San Francisco, Calif.
Oscar P. Snyder (Army—Regular), (Overseas Service).
Sherwood R. Steadman, St. Paul, Minn.
Clad C. Steward, Key West, Fla. (In Service—Navy.)
James T. Sweeney, Stockton, Calif.
Loren B. Taber, San Francisco, Calif.
Robert B. Tobias, Atlanta, Ga. (Army—Regular.)
Arthur L. Walters, Tulsa, Okla.
Benjamin S. Wells, Baltimore, Md.
Edward R. White, Jersey City, N. J.
Henry M. Willits, Dubuque, Ia.

Re Rescinding of Resolution on Dual-Membership. The Secretary presented the report of James C. Thompson & Company, Certified Public Accountants, who served as tellers of the ballots cast on the question of rescinding the following resolution as adopted at Atlantic City, N. J., July 11, 1937:

"Resolved, that the American College of Dentists will not admit to membership any person holding membership in any similar honorary dental organization. Fellows of the American College of Dentists, who are also members of a similar honorary dental organization, are requested to consider the propriety of early withdrawal from one or the other."

In favor of rescinding resolution.....	386	"Yes" votes
Not in favor of rescinding resolution.....	307	"No" votes
Defective ballots not classified or counted	4	votes

Total returned ballots..... 697

The Chairman declared the resolution duly rescinded.

Re Local Censors. The suggestions of the Sections relative to local censors were duly considered, and from the names submitted the necessary persons were selected to serve for a period of three years.

REPORTS OF COMMITTEES

Reports were received from the following standing committees: Preventive Service, Relations, Journalism and By-Laws.

Adjournment at 12:45 p. m.

AFTERNOON SESSION

The afternoon session convened at 2:00 o'clock. The following special committees made reports: Journal, 25th Anniversary and Survey.

Re 25th Anniversary. Because it seemed improbable that a regular convocation could be held this year, it was voted to recognize our 25th Anniversary by designating the September, 1945, issue of the Journal of the American College of Dentists as the 25th Anniversary Number, under the direction of Editor John E. Gurley and Chairman W. N. Hodgkin of the History Committee. The number is to carry a register of membership as of that date.

Re Survey Committee Report. The Survey Committee pre-

sented an extensive report on its study of the College, its activities and future possibilities under the following general outline:

1. The objectives of the College.
2. Organization:
Board of Regents,
Board of Censors,
Local Censors,
Secretary's Office.
3. The committee structure.
4. Section activities.
5. Representatives' plan.
6. The annual meeting.
7. Publication.
8. Ceremonial.
9. Annual election.
10. Visitations.
11. Rules for Fellowship.
12. Method of nominating to Fellowship.
13. Using the talent of the membership.
14. Other considerations.

All these matters were thoroughly discussed and possible changes and improvements were considered. These will be brought to the attention of the members as they are developed.

THIRD SESSION

The third session of the Board of Regents meeting was held on Monday morning, February 12, 1945, at 9:30 o'clock.

Re Research Committee Report. The Research Committee, which had been in session most of the previous day, made a very comprehensive report. Plans for a study of medico-dental relationships were presented; also plans for presenting Dentistry in a more favorable light to the public. Grants-in-Aid to the extent of \$500.00 were approved.

UNFINISHED BUSINESS

Re Eligibility Statement. A statement on eligibility to Fellowship was approved. This statement is to be attached to the nomination blank for the attention of nominators.

NEW BUSINESS

Re Nomination Blank. The Board of Regents agreed to certain changes on the nomination blank for the purpose of clarification.

Re Conferring of Fellowships in 1945. It was voted to again confer Fellowships through the cooperation of the Sections in the fall of 1945, if an annual meeting could not be held.

Adjournment, 12:45 p. m.

EDITORIALS

THE PUBLIC HEALTH

At last that which has been forthcoming over a considerable period of time, has put in an appearance. It is known as the Wagner-Murray Bill, S. B. 1050, and cited as "Social Security Amendments of 1945". It makes very general and generous provisions for the health of the people, including dental service, under the direction of the Surgeon General of the U. S. Public Health Service, in collaboration with the States, through their Health Departments and Children's Agencies. Certain aspects of the service are referred to the National Bureau of Child Welfare and the Secretary of Labor. It is sometimes referred to as "An American Beveridge Plan."¹ The idea which prompted the plan probably cannot be criticised. That increased and better attention should be provided for our children cannot be gainsaid. We have done well but we can do better. In the generations long past, certain people have provided well for themselves educationally, but who would discount our educational system? Perhaps some similar provision may be made for the health of the people, with special reference to children. And that provision is here made as indicated on pages 48 and 49, sections 521 and 522. Again on pages 92 and 93, section 210b, there is noted the possibility of restriction of service and indication of an age limit. These and other items in the plan will require very careful study. There must not be too much authority vested in one person, and particularly if he be not of that profession over which he may exercise powers. Neither can service be restricted to the minimum or that which may be called "blood and vulcanite." dentistry. It will be necessary then to give very careful attention to the plan insofar as dental service is concerned. The terms "adequate", and "inadequate" have never been very well defined. Neither have "dentistry", "organized dentistry" or "dentist". In fact, at a recent meeting of the Board of Trustees, the question, "What is organized

¹*The New Republic*, June 4, 1945, p. 775.

dentistry?" was proposed and left unanswered. It is incumbent upon us to finish this little job.

Several years ago, the American Dental Association proposed a set of "Eight Principles", concerning dental health service. These have been revised Oct. 16, 1944, and may well serve as a guide in the study now laid upon us. We submit them herewith for consideration:

1. *Research*—Adequate provisions should be made for research which may lead to the prevention or control of dental diseases.
2. *Dental Health Education*—Dental health education should be included in all basic educational and treatment programs for children and adults.
3. *Dental Care*—
 - a. Dental care should be available to all regardless of income or geographic location.
 - b. Programs developed for dental care should be based on the prevention and control of dental diseases. All available resources should first be used to provide adequate dental treatment for children and to eliminate pain and infection for adults.
 - c. Dental health is the responsibility of the individual, the family and the community in that order. When this responsibility, however, is not assumed by the community, it should be assumed by the state and then by the federal government. The community in all cases shall determine the methods for providing service in its area.
4. In all conferences that may lead to the formation of a plan for dental research, dental health education and dental care, there should be participation by authorized representatives of the American Dental Association.

DENTAL HISTORY: PATHETIC OR PROPHEPIC?

For one reason or another or for many, all of our efforts of the past appear to be misinterpreted in the present. Is it possible that these efforts of the years gone by, and not too long ago either, are being shown to be *pathetic* rather than *prophetic*?

Dentistry is in some measure a peculiar profession, when one considers the type of demand made upon the dentist. Yet in its personal relationship, in its humanness, in all of its functions, as may

be found delineated within the scope of the definition of a profession, including the intellectual requirement, dentistry does meet all the requirements of a profession. It is a profession in its own right and is not a branch of any other.

It does so happen that in its educational curriculum, dentistry requires knowledge of many of those subjects which enter into the course of study of the physician and of many other lines of study, too. We require knowledge of physics, but we do not need to adopt and adapt the curriculum of the physicist.

When we look back at many of the contributions made by dentists; when we realize the efforts for a better understanding of the greatest scourge to which all people are heir; when we recount the one hundred or more years spent in honest effort to bring about better tooth and mouth health; when we realize the success which has been ours and that due to our own efforts; when we interpret all of these and see that it has been possible because our minds have been directed toward dentistry and not submerged within another; when we realize the contributions made by dentists, Fauchard, Wells, Morton, Hayden, Harris, Bonwill, Flagg, Miller, Black (G. V.), and the host of others, surely we have a history that is *prophetic*, and now for us to sell our "birthright for a mess of pottage" would be *pathetic*.

There is and there always will be much to do in the field of dentistry, as in all other fields. We especially need a closer correlation between the basic sciences and their clinical application. But dentists are they who know the clinical application and therefore must be the men to bring this about. We are in a transition period—a time of greater change within our profession than has heretofore been experienced. One hundred years ago men had to devote themselves to perfecting the clinical side. People were in trouble and had to have relief. This has been accomplished, so that now we must devote our energies more thoroughly and more completely toward the prevention of these disorders. Who but the dentist, or the man whose mind has been dentally directed and trained, is competent?

Several facts appear to stand out, and which must be seriously considered:

1. We must not allow ourselves to be overcome with an inferiority complex, and so be engulfed within another group. This will weaken dentistry in its ministrations, and the public as well as we will suffer.

2. We must not allow ourselves to be overcome with the clinical phase of our total function, thus returning to the dentist of yesterday, who "pulled teeth and made plates." Always have real men like those named above held to a higher ideal in service, making this a step over which we had to travel and at the same time making that work more useful.

3. Nor must we succumb to academicians and others who for one reason or another would relegate us to the field of mechanics, to be directed by those who may sit in a swivel chair, without realization from the standpoint of reality of the application of their knowledge.

4. We do not want a pre-dental curriculum identical with that of students of medicine. That is over-crowded now. And how could we handle it? We need our own pre-dental curriculum pointing toward dentistry, so that to a better and still better extent the student of dentistry, even in his pre-dental years will gain some idea of that into which he is coming. It should also make provision for a minimum loss of time, if any, in case he should see fit to change his course.

5. Dentistry is not a branch of medical practice. There isn't any point that can be made establishing the truth of that idea. Dentistry is a HEALTH PROFESSION, along with medicine, sanitation, hygiene, and possibly others. This apparently is overlooked and it is up to us to establish that fact and permanently in the minds of men, including ourselves first. It is unfortunate that so worthy an institution as the New York Academy of Dentistry should have prepared a lengthy apology for the dental profession and then have consented to the thought that we are a "specialty of medical science."

There is no medical science. We are a HEALTH PROFESSION and are inter-related with all other health professions, including medicine.

The effort of Columbia University is the second attempt now to submerge dentistry within medicine. In fact, they have only taken one step in advance, for they have not dignified either their dental school or the administrator of the school with the title of Dean.

6. In the period 1830-50, it is interesting to note that, "With less amiable cooperation, in fact with some heartburning, medical science made some advances of world importance. The most important of these were in the direction of anesthetics, . . ." But it is also notable that of three men associated with this discovery, two were dentists, one of whom became a human guinea-pig in order to prove the anesthetic qualities of nitrous oxide, and, of course, of similar agents.

7. Finally, we have become careless in that we have allowed certain sciences to be known as "medical sciences". This is not true for these same sciences or studies are used in every and all branches of learning. When one has attained a required goal or level in his studies, or in his acquisition of knowledge, he can go out into the world and put that into practice. This is what happens in every field of service, including medicine and dentistry.

We must be more careful that our past record maintains its *prophetic* direction as our predecessors willed, and not become *pathetic* because of our lack of will.

SNARKS OR BOOJUMS IN DENTAL EDUCATION

Readers of Lewis Carroll's *Hunting of the Snark* will recall that the Snark is a fantastic animal who represents the always unattainable goal—never quite reached, but always sought. The major danger encountered in Snark hunting is the ever present possibility of meeting a Boojum. This horrible animal looks exactly like a Snark, and

¹Schlesinger, A. M., and Fox, D. R. (Editors): A History of American Life, Vol. VI, p. 241; MacMillan Co.

it is only when you have it in your grasp—your search rewarded—that you realize your mistake.

“But if ever I meet with a Boojum, that day,
In a moment (of this I am sure),
I shall softly and suddenly vanish away—
And the notion I cannot endure.”

For over one hundred years, the dental profession has been Snark hunting for the perfect educational background for their graduates, and always with the fear that the search will end, not with a Snark, but with the Boojum, Medical Education, and dentistry will “softly and suddenly vanish away . . .” The recent changes in educational programs at Harvard and Columbia have freshened this fear, and we have yet to identify this movement as “Snark” or “Boojum.”

A brief study of the history of dental education indicates that a change in our program is imminent. When the relief of pain was the major objective, educational background was not needed. Later, dentistry included the restoration of teeth and parts of teeth. The apprenticeship method of education provided a satisfactory educational background. Shortly after the turn of this century, the elimination of infection was added to the objectives of dental practice, and the need for professional courses on the college level became apparent. With the advent of the present “control of caries” period, the educational program changed, with a deepening of the educational requirements, the predental years, and so on.

Today, the study of the relation of sugar to caries, the recent developments in the fluorine investigations indicate we are approaching a new objective in dental practice—the prevention of dental disease. If history repeats, and we do acquire a new objective, it is reasonable to suppose we will see corresponding changes in the educational requirements for dental graduates. All of the schools are aware of this impending change: Harvard and Columbia, with their previous relations with the medical schools, have adopted their present programs as their method of “Snark Hunting.”

If the *only* function of dentistry were to prevent dental disease, these programs would be in the right direction. However, we still

have the other functions accumulated through the years. We still must relieve pain, restore teeth, eliminate infection, and control dental disease. These objectives all call for high degrees of technical and clinical skill, and for many years to come emphasis in the dental curriculum will have to be placed upon the attainment of these skills. The big problem in dental education today is to hold tight to the old objectives of dental practice, as well as prepare our students for this new objective.

Another approach to the study of this problem is to examine the developments in the whole expanding field of health and science, in which nursing, pharmacy, social service, medicine, and dentistry is each filling its respective functions. Public health—at one time a part of medicine—is emerging as a separate educational program. Nursing is getting out from under the administrative thumb of the medical school. Pharmacy is an autonomous profession. Certainly there is no trend that would lead us to believe that there is a centripetal force throwing all of the health service groups into the arms of medicine. There is no sign that medicine wants this. The medical group is busy in their own field, narrowing their scope of activities rather than widening it. It is not unreasonable to believe that dental education, directed by the changing needs of dental practice, is taking its place with the other health sciences in a shoulder-to-shoulder relation: autonomous in its administration and curriculum and an integral part of our university system.

At the present moment, the important point to remember is that a change in dental practice is developing and that dental education must again prepare for a Snark Hunt, and again chance meeting a Boojum. There is no reason why we should all hunt up the same valley or use the same methods.

“You may seek it with thimbles—and seek it with care;
You may hunt it with forks and hope;
You may threaten its life with a railway share;
You may charm it with smiles and soap—”

A study of the history of Snark Hunting helps, too.

W. C. F.

BOOK REVIEWS

Under the heading, "Book Review," many editors over the country, both of dental and non-dental periodicals, have published reviews of the book, "Cost of Dental Care for Adults Under Specific Clinical Conditions," by Dorothy Fahs Beck, assisted by Mary Frost Jessup, and sponsored by the Socio-Economics Committee of American College of Dentists.

There is submitted herewith an analysis of several of these.—ED.

BOOK REVIEWS AND COMMENTS ON "DENTAL CARE FOR ADULTS"

"Cost of Dental Care for Adults Under Specific Clinical Conditions," by Dorothy Fahs Beck, a study project sponsored by the Socio-Economics Committee of the American College of Dentists, was published in 1943.

Ten book reviews and comments otherwise appearing in non-dental periodicals during 1944 have come to our attention.

Excerpts from these follow:

Medical Care, IV (February, 1944)—(An abstract from an editorial note preceding the abstract, excerpts from which follow.):

"—a highly important dental survey—".

"Mrs. Beck's report documents the fact that even the prewar supply of dentists and assistant personnel could furnish only a small fraction of the dental care needed by the people of the United States."

[It] "demonstrates that the work and the cost of putting American mouths into good condition would be at least five times the cost of keeping them so."

"It shows that the insurance principle can be applied in an important sector of dental service."

(*From the abstract*): "At regular adult fees, initial care received by these 485 patients cost an average of \$52.66, of which \$23.78 (45.2 per cent) was for prosthetic work; \$19.37 (36.8 per cent) for fillings; \$3.20 (6.1 per cent) for extractions; \$6.01 (11.9 per cent) for X-rays, prophylaxes, examinations, miscellaneous treatments and services of specialists."

"During an average maintenance, year care received cost these patients \$10.05 at regular adult fees at the clinic, of which \$4.80 (47.8 per cent) was for fillings; \$2.76 (27.4 per cent) for prosthetic work; 20 cents (2.0 per cent) for extractions; \$2.29 (22.8 per cent) for diagnostic and preventive care and services of specialists."

"At the rate of 6.9 chair hours per adult, all dentists in active practice

in the United States in 1938—if they had devoted themselves exclusively to initial care—would have been able to provide it for less than 20,000,000 adults per year of a total population of over 130,000,000.”

“... for those able to pay in part for their dental care, use of insurance offers the possibility of spreading costs over periods of time and large groups of individuals.”

Social Security Bulletin, VII (March, 1944): “A detailed analysis, with discussion of basic principles for adequate dental care of adults. Considers various solutions to the problem of adequate dental care, including the insurance method. The findings are compared with the results of other studies, and a chapter is included on trends in the financing and distribution of health services.”

Survey Midmonthly, LXXX (April, 1944): “The most extensive comparison between dental fees and costs ever to be made in this country is included in ‘Dental Care for Adults’, a study prepared by Dorothy Fahs Beck and Mary Frost Jessup, under the auspices of the Socio-Economics Committee of the American College of Dentists.”

“The authors point out that if every adult in the country received as adequate care as the patients under study, the volume of service would greatly exceed the maximum that could be rendered by all the dentists and their assistants in the United States. But they add: ‘There is no reason to believe that the supply of dentists is greatly out of line with effective demand for care.’”

Hospitals (June, 1944): “The primary purpose of the study was the exploration of basic principles governing the cost and professional time required for adequate dental care of adults.”

“Many more dentists and hygienists are required to meet existing needs; the training of these workers must go hand in hand with public education on the values of oral health.”

International Labor Review, L (July, 1944): “Dental Health Service, Incorporated, is a low fee clinic for persons ineligible for free care and unable to pay prevailing private fees.”

“The report deals with the services given to meet the needs of initial and maintenance care, the professional time required and the cost to the clinic, the cost to the patient and the price he would pay for such service at low urban private fees.”

“The material assembled in this report should be useful to all who are studying ways and means of achieving universal dental health.”

Public Welfare, II (July, 1944): “This study, . . . is one of the most thorough and detailed studies made in recent years, and contains a wealth

of information which will be useful to public welfare administrators in dealing with dental care programs and difficult problems of cost involved."

"Suffice it to say that anyone concerned with problems of costs of dental care cannot afford to be without a copy."

Medical Care, IV (August, 1944). (From comments by five dentists): "The data provided by the records of Dental Health Service were very complete, thus making possible a very searching analysis of dental costs. The analysis itself was very thorough and has been developed so as to bring out the most pertinent dental facts. So far it is the only study that gives these facts in terms of actual experience instead of estimate."

"This study, published under the auspices of the American College of Dentists, is perhaps the most monumental effort made on the subject since the publication of the findings of the Committee on the Costs of Medical Care."

"If Mrs. Beck's figures are to be used in other parts of the country, they must be properly adjusted for regional differences, and all available data, both present and future, used to assure that the adjustment is accurately made."

"These reservations as to the wider application of the data, however, do not invalidate the many specific conclusions drawn by the author. Chief among such conclusions, to my mind, is the accurate quantitative proof of a difference between the costs of initial and maintenance dental care."

"This study I consider by far the most exhaustive and accurate of any so far made concerning the problems involved in the extension of adequate dental health service to the large number of people not now receiving it."

"For the dentist in private practice as well as the social planner it brings out the most serious defect in a fee for service program."

American Journal of Public Health and the Nation's Health, XXXIV (September, 1944): "This particular study is limited to the 'twin questions of time and cost' in rendering adequate dental service to a low income group of patients; i. e., the time required to provide initial rehabilitation service and maintenance service thereafter and the cost of such services over a period of years."

"Without question, the largest expenditures of public funds for dental care and dental health education are applied through public schools and departments of health toward the prevention or control of dental disease in children, which is an indication of public interest in dentistry."

Journal of the American Statistical Association, XXXIX (September, 1944): "This monograph represents perhaps the most thorough and en-

lightened exploration yet available of the general issues involved in the problem of assaying and meeting the dental service needs of adults."

"The main value of the monograph lies not in the statistical tables covering a small sample of adults, but rather in the description and elaboration of methodologies which will be of considerable usefulness for other workers of the future, who will deal with larger and more representative samples of the whole population."

American Sociological Review, IX (1944): "In all the current discussion of health insurance there has been wide disagreement regarding the cost of a program of adequate medical care. So far as dental care is concerned, one important segment of such a program, the present detailed statistical analysis makes an important contribution."

"For many years the Dental Health Service of New York City has provided, on a cost basis, first-class dental care for patients who could not afford private care."

"The authors apply the results of this study to the general population of the United States, admittedly a hazardous procedure, . . ."

From the above and otherwise, it is quite evident that this project financed as it was by the American College of Dentists, has been very well received by those, other than dentists, interested in this field of endeavor.

It is interesting to point out that when the manuscript was turned over to the American College of Dentists by the Committee on Socio-Economics, it was referred to a Reference Committee for study and recommendation.

One of the foremost recommendations of the Reference Committee was to change the text so that readers would not conclude that the services rendered at New York Health Service, Incorporated, were "adequate" from the standpoint of what should be so considered for the American people. This recommendation was concurred in by the Regents of the College and appropriate recommendations were made and agreed to by the authors.

Yet withal, (see the reviews in *Social Security Bulletin*, *Survey*, *Midmonthly*, *Hospitals*, *American Journal of Public Health* and *the Nation's Health* above) four reviews contain unmistakable evidence of assumption that the services rendered were deemed adequate.—E. G. S.

Medical Licensure Examination: This is the title of a book edited by Walter L. Bierring, M.D., F.A.C.P., M.R.C.P., Edin. (Hon.), Secretary, Federation of State Medical Boards of the United States. It is the fifth edition, and while of immediate practical value to medical students, it will serve a useful purpose to dentists both from the standpoint of general medical information and to the dental student as he reviews medical subjects for the State Board examination. However, a search of the index and an examination, though hasty, of the pages of the text, reveal only the slightest reference to teeth, pertaining to their relationship to the mandible. Other organs, both as they are involved pathologically and as they may involve other parts as foci of infection, are considered, yet no mention of teeth is made. It is to be wondered whether teeth are a part of the body; whether they may become involved pathologically; or whether they may be considered as foci of infection.

The book carries a preface to the first and the fifth editions, and apparently a new chapter entitled, "The Philosophy of Examinations." It contains 545 pages, including an index, and consisting of eleven chapters reviewed by the editor and seven collaborators, selected from various representative medical schools. It is published by J. B. Lippincott Company, Philadelphia. Price, \$6.00.

The Dentist and His Patient: This is the title of a book—a 496-page compilation of material and techniques forming a course of graduate study in Practice Management—prepared by a group of dentists and edited by David Friend. It carries a foreword by Harold J. Leonard, D.D.S., Professor of Periodontology, Columbia University, School of Dentistry.

It is published and distributed by a group of dentists who have completed the course, who are satisfied with it, and who are desirous of passing it on to their confreres, as well as to provide that which dentists may require, but have had so much of, only through courses in salesmanship, presented by laymen who do not know the professional side, and therefore, fail to too great a degree.

In this the plan is no doubt, quite satisfactory, and the book will provide much valuable information and many worthwhile sugges-

tions to dentists. It is novel in its conception, and while much will be varied among readers according to personalities, yet on the whole it does present a very good picture of the "dentist in action," from day to day. It really is a book of technique and not of information. Published by Organization Publishing Co., 6 East 45th St., 17, New York, N. Y.: Price \$10.00.

Report, Palama Settlement, Honolulu: This settlement, better known as the Strong-Carter Dental Clinic, has just released their twenty-fourth annual report for the year 1944. This clinic has suffered many handicaps and disappointments during the year, as a result of the war, but in spite of all that, satisfactory accomplishment has been made. Copies may be had by addressing the Settlement at 810 N. Vineyard St., Honolulu, 10, Hawaii, U. S. A.

Rockefeller Foundation: A Review for 1944: This review, by the President, Raymond B. Fosdick, has only recently been released. In it the accomplishments of the year are set forth in interesting and informative manner. Copies are available by addressing the Foundation at 49 W. 49th St., New York.

WELLS' MEMORIAL: A REDWOOD TREE

The profession is invited to visit the Horace Wells' Memorial Redwood Tree and Tablet in Golden Gate Park, San Francisco. Due to wartime delays, the inscribed stone could not be completed at the time the tree was planted, but is now permanently set at its base. It is a very attractive and fitting memorial to this great man, and of which we may be proud.

ERRATUM

An error occurred in the name of the publishers of Standard Rate and Data Service mentioned in footnote 5 in the Report of the Committee on Journalism in the December, 1944, issue of the JOURNAL, page 360. Corrected footnote should read: Standard Rate and Data Service, 333 North Michigan Ave., Chicago, Ill., Class 35, p. 113, Dec. 15, 1943.

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