BULLETIN OF THE
HISTORY OF DENTISTRY

Official Publication of the
American Academy of the History of Dentistry

Editor

Editorial Board
Lloyd E. Church, D.D.S., Ph.D., F.A.C.D.
J. Henry Clarke, D.M.D.
Jerry J. Herschfeld, D.D.S.

NOTICE TO CONTRIBUTORS
Contributions, which may deal with any aspect of dental history or bibliography, are invited. The maximum length for original articles is about 5000 words. Manuscripts should be typewritten with double spacing and wide margins. Only one copy need be submitted. Please consult former issues as to both literary style preferred as well as method of listing references. All references should be as complete as possible and contain the name(s) and initial(s) of the author(s) and the full title of the paper or book. Citations of periodical articles should include name of journal, year, volume number and complete pagination, in that order. For books cited, the city of publication, publisher, date and full pagination are to be given. All photographs which are intended to accompany articles must be black-and-white glossy prints no smaller than 3x5 inches. Photographs will be returned only if so requested.

Manuscripts, as well as all correspondence relating to advertising, the publication of papers, news-items and so forth should be addressed to the Editor, Bulletin of the History of Dentistry, 2 Roby Drive, Rochester, NY 14618.

SUBSCRIPTIONS AND OTHER BUSINESS MATTERS
Active and honorary members of the American Academy of the History of Dentistry receive the Bulletin as a consequence of their membership. The subscription price for all others, domestic and foreign, is $12.00 per year. Foreign subscriptions must be paid for in United States funds. All copies sent to foreign countries by surface mail only. No arrangements can be made for air-mail delivery.

All correspondence pertaining to subscriptions, rates, servicing of existing subscriptions should be addressed to the Circulation Director:
Aletha Kowitz
Bureau of Library Services
American Dental Association
211 East Chicago Avenue
Chicago, IL 60611

The Bulletin is published semi-annually in April and October
ISSN: 0007-5132
The Officers of the
American Academy of the History of Dentistry

President
DR. ARDEN G. CHRISTEN
Indiana University
School of Dentistry
415 Lansing Street
Indianapolis, IN 46202

President-elect
DR. JACK W. GOTTSCHALK
8040 Reading Road
Cincinnati, OH 45237

Secretary-treasurer
DR. H. B. McCAULEY
3804 Hadley Square East
Baltimore, Maryland 21218

Vice-president
DR. JOSEPH SALCETTI
5207 Wisconsin Ave., N.W.
Washington, DC 20015

Editor
DR. MALVIN E. RING
2 Roby Drive
Rochester, New York 14618

Historian
DR. RICHARD A. GLENNER
3414 West Peterson Avenue
Chicago, Illinois 60659

The American Academy of the History of Dentistry, a not-for-profit organization founded in 1951, has as its goals the following:
Increasing interest among dentists in dental history.
Encouraging dental schools to develop historical collections on dentistry, and to offer adequate instruction in dental history.
Developing a broader understanding of the facts of dental history among the leaders in dentistry in order to aid them in their attempts in solving important problems in dental education and practice.
Stimulating more thorough and comprehensive research in dental history, thereby extending the boundaries of dental knowledge, giving substantial support to growing professional culture.
Creating an authoritative body to which important questions relating to dental history could be referred for factual verification.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMEDY OR CRUELTY: THE DENTIST AS PORTRAYED IN LITERATURE AND ART</td>
<td>1</td>
</tr>
<tr>
<td>—Suzanne Poirier, Ph.D.</td>
<td></td>
</tr>
<tr>
<td>THE HISTORY OF THE CHARACTERISTIC JAPANESE WOODEN DENTURE</td>
<td>9</td>
</tr>
<tr>
<td>WILLIAM G. BONWILL: A LEADING LIGHT OF DENTISTRY IN THE 19th CENTURY</td>
<td>17</td>
</tr>
<tr>
<td>—Daniel J. DiGiacomo, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>THE HISTORICAL DEVELOPMENT OF DENTISTRY IN CHINA</td>
<td>21</td>
</tr>
<tr>
<td>—Yiming Li, D.D.S., M.S.D.</td>
<td></td>
</tr>
<tr>
<td>Baowei Zhang</td>
<td></td>
</tr>
<tr>
<td>Arden G. Christen, D.D.S., M.S.D., M.A.</td>
<td></td>
</tr>
<tr>
<td>ODDMENTS IN DENTAL HISTORY: DOES A GARRULOUS PATIENT JUSTIFY A HIGHER</td>
<td>29</td>
</tr>
<tr>
<td>FEE? A CASE FROM 1862</td>
<td></td>
</tr>
<tr>
<td>—Malvin E. Ring, D.D.S., M.L.S.</td>
<td></td>
</tr>
<tr>
<td>TOOTH AND TOOTHACHE IN NORWEGIAN FOLKLORE</td>
<td>31</td>
</tr>
<tr>
<td>—Kai Hunstadbraten, Dr. Odont.</td>
<td></td>
</tr>
<tr>
<td>CLASSICS IN DENTAL HISTORY: ROBERT L. NELSEN AND THE DEVELOPMENT OF THE</td>
<td>37</td>
</tr>
<tr>
<td>HIGH SPEED HANDPIECE</td>
<td></td>
</tr>
<tr>
<td>—Jerry J. Herschfeld, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>DEVELOPMENTS IN PROSTHETIC DENTISTRY IN THE 19th CENTURY</td>
<td>43</td>
</tr>
<tr>
<td>THE ANTIQUE BOOK COLLECTOR'S CORNER: DENTAL REMEDIES OF THE BOTANIC</td>
<td>54</td>
</tr>
<tr>
<td>HEALERS OF EARLY AMERICA</td>
<td></td>
</tr>
<tr>
<td>—Max Geshwind, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>WHAT IS IT? —Alex Peck</td>
<td>57</td>
</tr>
<tr>
<td>DENTISTRY IN FOLK ART XXIV: SAINT APOLLONIA</td>
<td>60</td>
</tr>
<tr>
<td>NOTES AND QUERIES</td>
<td>62</td>
</tr>
<tr>
<td>A further note on the dental aspects of the Compositioines</td>
<td></td>
</tr>
<tr>
<td>of Scribonius Largus. By Jeffrey S. Hamilton, Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Help sought in tracking down historical book “American dentistry” in</td>
<td></td>
</tr>
<tr>
<td>Paris a century ago. By Jacques Fouré, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>How a munched apple gave a robber away: an incident in the history of</td>
<td></td>
</tr>
<tr>
<td>forensic dentistry. By Oskar Sykora, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>Some history of dentistry in Western Australia. By R.F. Stockwell, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>50th anniversary of the Wellcome Institute</td>
<td></td>
</tr>
<tr>
<td>LETTERS TO THE EDITOR</td>
<td>68</td>
</tr>
<tr>
<td>BOOK REVIEWS</td>
<td>70</td>
</tr>
</tbody>
</table>

BULLETIN OF THE HISTORY OF DENTISTRY, VOL. 35, NO. 1, APRIL, 1987
Alex Peck, Antique Scientifica, offers an exceedingly fine presentation dental chest put together by Kern of Philadelphia. The fitted rosewood case holds some 130 instruments, many with handles of mother-of-pearl (some set with gold-mounted jewels), coral, ivory and ebony. A gold plaque attached to the lid is inscribed Lloyd Quinby.

It is thought that the set was given to Dr. Quinby in 1859 as a wedding present from Fanny Ringgold, his bride. Quinby was graduated from the Baltimore College of Dental Surgery and practiced in Houston, Texas.

Besides the many other dental and medical antiques in stock, Alex Peck is now carrying Elizabeth Bennion's new book Antique Dental Instruments. $40.00 postpaid.
Comedy or Cruelty: The Dentist as Portrayed in Literature and Art

— Suzanne Poirier, Ph.D.
Chicago, Illinois

The history of a profession, as well as of a nation or a culture, can be learned from how it is depicted in art and literature. The practice of dentistry in Europe from the 16th to the 19th centuries has been meticulously recorded. And while artists often record the technical aspects of treatment, their work is perhaps more important for its depiction — fairly or unfairly — of what hasn’t changed. However advanced dentistry has become, certain attitudes toward it have remained constant. Art and literature reveal these constants and give some explanation for their persistence.

It must be acknowledged from the outset that the stories and pictures of dentistry presented here are almost all unflattering. Because the arts often focus on drama, the images they portray may seem to be unfair exaggerations. Yet they represent stock images and stereotypes that people may widely recognize even when their own experiences belie those images. Acknowledging these images is important because the fears and misperceptions a patient brings into the dentist’s office can affect the whole visit.

Dentistry in the 1850’s was, unquestionably, less dignified for both dentist and patient than it is today. A Dr. Herring of North Carolina records the following event:

I remember the first tooth I ever saw extracted. The patient was a lady. For better light she was taken out in the yard and placed on her back. One man to each arm, one to hold her head, and a fourth to sit on her feet; the operator on his knees across her chest, and with an instrument shaped something like a cant-hook and called a “key” fastened it on the tooth and began to twist.

Through the years, the increasing science and professionalism of dentistry has removed much, though not all, of the morbidness accompanying the dentist’s image. Thus, Dorothy Sayers’ detective hero, Lord Peter Wimsey, can spend an afternoon having a tooth filled and make only one complaint, “And for goodness’ sake make it firm and not too much of your foul oil of cloves. I don’t want bits to come out in the middle of dinner. You can’t imagine the natiness of caviar flavoured with cloves.” (Wealth does have some disadvantages).

Dentistry is, generally, depicted less frequently in the arts today than it was in the past. Dentistry has been “cleaned up” — both technologically and visibly. Where dentistry once took place outdoors, in the marketplace and at fairs, it now takes place in the office. Antiseptics and anesthetics have made it less treacherous and less rambunctious. But popularly, two main images, comic and demonic, persist. Comic images are the most common: Alan Arkin in The In-Laws, Don Knotts in The Shakiest Gun in the West, and Jerry the orthodontist in the old Bob Newhart Show are contemporary examples. In the case of Lord Peter Wimsey, once his gastronomic dangers of dentistry wane he is at leisure for other reflections, and we are treated to a lengthy monologue from Wimsey’s garrulous dentist, Mr. Lamplough, whose gossip — which introduces the murder which Lord Peter will eventually solve — professional directions, and electrical instruments become indistinguishably mixed:
“Oh, yes — but as it was a wooden shed, full of petrol, it simply went up like a bonfire. Just a little bit over this way, please. That’s splendid.”

Gr-r-r, whizz, gr-r-r. “As a matter of fact, they seem to think it might just possibly be suicide . . . His family’s down at Worthing, staying with his mother-in-law or something. Tell me if I hurt you.” Gr-r-r . . .

“A-ow--oo--uh-hi--ih?” inquired Wimsey naturally enough.

“How do I come into it?” said Mr. Lamplough, who, from long experience was expert in the interpretation of mumblings. 3

In comparison, there are few demonic dentists, but those who exist today have reached heights unimagined even in dentistry’s most primitive days. Perhaps the potential for terror inherent in modern instruments outshines even the dreaded toothkey, as demonstrated by the dentist-torturer in the film Marathon Man. Past and present associations of dentistry with torture are probably based on the need for strength in dentistry (on the part of both dentist and patient) and the aura of violence it can evoke. Violent energy pervades many early paintings of dentistry (fig. 1). Gabriel Garcia Marquez presents in one of his short stories this encounter of a small town dentist and the town’s new dictator:

It was a lower wisdom tooth. The dentist spread his feet and grasped the tooth with the hot forceps. The Mayor seized the arms of the chair, braced his feet with all his strength, and felt an icy void in his kidneys, but didn’t make a sound. The dentist moved only his wrist. Without rancor, rather with a bitter tenderness, he said: “Now you’ll pay for our twenty dead men.”

Most people writing about dentists write from the receiving end of the forceps, and, as reasonable as they may otherwise be, there is always a streak of ill will that patients never quite overcome. What the dentist does to a person with drills, scalers, etc. is, if not painful, at least uncomfortable. (Fig. 2). The mouth is pulled and pried and stuffed. In this sense a trip to the dentist can often be much more physical, more invasive, than many encounters with physicians, where patients are modestly draped and surrep-
titiously palpated and listened to. If medicine must become really unplea-
sant, the patient is often fully sedated — or an assistant is called in to per-
form the procedure.

Dentists, on the other hand, must sometimes be the perpetrators of pain — however gentle or well-intentioned they may be. And human nature somehow seems to carry a grudge. Sarcasm is the tone adopted by Mark Twain to describe his dental adventures:

Fig. 2. “The Toothache — or, Torment and Torture” by Thomas Rowlandson, 1823.
I go down every other day & have one or two teeth gouged out and stuffed. . . . The dentist is a bright man, & gouges & digs & saws & rasps & hammers, & keeps up a steady stream of entertaining talk, all the time . . . [These visits] have been a vast improvement to me, too — an education; I can stand the most exquisite pain, now, without outward manifestation; & indeed without any very real discomfort.5

Although patients often feel relief and gratitude toward the dentist, the memory of pain or expected pain is more memorable by far. Such expectations can even create an anticipated, but curiously non-malicious hostility in the patient, as illustrated by a patient in George Bernard Shaw's play, You Never Can Tell, who explains why she didn't have anesthesia for a painful extraction:

YOUNG LADY: Because you said it would be five shillings extra.
DENTIST: Oh, don't say that. It makes me feel as if I had hurt you for the sake of five shillings.
LADY: Well, so you have! Why shouldn't you? It's your business to hurt people.6

Part of the violence seen or expected in dentistry appears somehow to be connected with the violent pain of toothache itself. Figurative depictions of people suffering from toothache are unparalleled in their woe-begone expressions (fig. 3). In literature, descriptions of toothache rise to a poetry all their own. Maya Angelou, writing of her childhood in Stamps, Arkansas, in the 1930's, remembers:

Fig. 3. "A Monk with a Toothache" by Carl Bloch, 1834-1890.

I had two cavities that were rotten to the gums. The pain was beyond the bailiwick of crushed aspirins or oil of cloves. Only one thing could help me, so I prayed earnestly that I'd be allowed to sit under the house and have the building collapse on my left jaw . . .

I lived a few days and nights of blinding pain, not so much toying with as seriously considering the idea of jumping in the well, and Momma decided I had to be taken to a dentist.7

The descriptions continue: Scotland's Robert Burns, in 1797, poetically described a toothache:
My curse upon your venom’d stang,
That shoots my tortur’d gooms alang,
An’ thro’ my lug gies monie a twang
Wi’ gnawing vengeance,
Tearing my nerves wi’ bitter pang,
Like racking engines!

When fever burn or ague freezes,
Rheumatics gnaw, or colic squeezes,
Our neebors sympathise to ease us
Wi’ pitying moan;
But thee! — thou hell o’ a’ diseases,
They mock our groan!

In *The Old Wives’ Tale*, Arnold Bennett creates poor Mr. Povey, whose toothache reduces him to a shadow of his former self. Bennett writes, “As for the toothache, its action on Mr. Povey was apparently periodic; it gathered to a crisis like a wave, gradually, the torture increasing till the wave broke and left Mr. Povey exhausted, but free for a moment from pain.”

For all the vividness of the pain described, there seems to be something almost degrading about suffering from toothache. Complainers are often mocked at rather than sympathized with, supporting Burns’s charge that “neebors” can be called upon for support in cases of fever or colic, but will only mock when the problem is toothache, the “hell o’ a’ diseases.” It seems somewhat contradictory that so much comedy should accompany the pain of toothache, when the value of teeth has been recognized throughout history. In *Age Confronting Youth* (fig. 4), Leonardo da Vinci characterized the two by their respective absence and presence of hair and teeth. Cervantes’ Don Quixote was dubbed “Knight of the Mournful Countenance” because he had lost several teeth from a fall off a horse. He confides, “I must tell you, Sancho, that a mouth without grinders is like a mill without a millstone, and a tooth is more to be prized than a diamond.” It is perhaps because teeth are so important that they are a source of humor. That such a small, otherwise commonplace part of the body should
be so important — that such a little thing could hurt so much — can be embarrassing to an otherwise capable adult. Gunter Grass put it best in Local Anesthetic, a stream-of-consciousness novel that takes place almost entirely in a dentist's chair: 'Woe, my tooth. Woe, the hair in my comb . . . It's always what's closest that hurts loudest. Or what backs up on you and reminds you . . . Woe, shadows, woe. Pebbles, woe. Woe, toothache, woe.'

To be so dependent on one's teeth can be annoying and embarrassing to all people who assume themselves to be relatively self-reliant. Thus, shame is a theme that runs throughout much of the literature about dentistry. As Twain continues his recital of his Rigg's disease treatment, he talks of his stoicism:

He put his tool into my mouth, rooted it under a gum and began to carve. He seemed to fetch away chips of bone the size of my hand . . . In truth what he removed could hardly have been seen without a microscope, I suppose — but my imagination is a microscope. If I had been honest enough to speak my mind I would have said 'Ow,' to every dig, and shouted it; but I was ashamed to do that, and so only said 'Um,' in a low voice, and kept back the exclamation point.

Twain is making two points here: first, not only is he expecting the worst, which he admits never happens, but, second, his senses fail to give him an accurate picture of what's really going on inside his mouth. All reference to scale is lost, with tiny holes feeling like gaping voids and "chips of bone" growing to handsize. The patient feels incredibly vulnerable. One must not only have faith in one's dentist, but it must be, quite literally, a blind faith that all is going well.

Patients are exposed — again, in ways not usually experienced when visiting a physician. Communication nearly vanishes when one's mouth is full of someone else's hands. Virginia Woolf, in her essay "Gas," was acutely aware of her dependence on the trustworthiness and good will of dentists when she was under anesthesia:

The ordinary conventions lapse, for in ordinary life one does not after shaking hands with an unknown man at once open one’s mouth and show him a broken tooth. The new relation with the third sex is stony, statuesque, colourless, but nevertheless humane . . . Very well, I resign myself to your charge, one says . . . and at your command I cease to breathe through the mouth and breathe through the nose; breathe deep, breathe quietly, and your assurance that one is doing it very nicely is a parting salute.

Woolf saw her dentist and his anesthesiologist, in their uniformed jackets, as sexless creatures and derived confidence from this neutering. But this image is not always prevalent. Whether "sex in the dentist's chair" has ever really occurred, the possibility has always been a source of great fantasy for many artists and writers. Last year, for example, several episodes of television's popular Hill Street Blues dealt with convicting an orthodontist who acted out his shoe fetish on anesthetized female patients. Such fantasies are probably fed by the patient's vulnerability and the aura of violence surrounding some images of dentistry.

Probably the most famous fictitious dentist is Frank Norris's McTeague, created early in the 20th century. McTeague's career proceeds uneventfully until Trina enters his office with a particularly deep carious lesion which requires ether:

McTeague straightened up, putting the sponge upon the rack behind
him, his eyes fixed upon Trina's face. For some time he stood watching her as she lay there, unconscious and helpless and very pretty. He was alone with her, and she was absolutely without defense. Suddenly the animal in the man stirred and woke; the evil instincts that in here were so close to the surface leaped to life, shouting and clamoring.\textsuperscript{14}

\textit{McTeague} was Norris's contribution to the debate raging at the turn of the century as to whether nature or nurture held sway over the human animal. Norris was obviously taking the side of nature, and most likely he saw McTeague's behavior as representative of the human condition, with McTeague more as an unsophisticated, not-too-bright Everyman than the epitome of the early 20th century dentist.

However questionable a portrait of Norris' dentist McTeague may be, Norris pays him the compliment of being human, not faceless or thoughtless like so many literary portraits. Whatever McTeague's thoughts, the reader sees life from his point of view, an occurrence unusual in a body of literature which almost unanimously takes the side of the patient. Another rare exception is Anton Chekhov's short story, "Surgery," in which an apprentice surgeon in Russia must pull a badly rotted tooth. He doesn't do a very good job — he probably uses the wrong forceps — but when his patient's anger becomes abusive, the harried man finally lashes out:

\begin{quote}
Teach your grandmother to suck eggs! Oh, Lord, the ignorance of the people! Live with them and you go out of your mind. Surgery is no joke, brother . . . The tooth appears to have been neglected for a long time.\textsuperscript{15}
\end{quote}

To repeat a statement from the opening of this paper, the picture presented here is much bleaker than the everyday reality of the practice of dentistry. It is clear, however, that the popular images of dentists are unremittingly negatively stereotyped. Not for dentistry are the Dr. Kildares or Marcus Welbys. In spite of the fact that dentists repeatedly rank above physicians in popular opinion polls, dental heroes do not emerge in the public media. Representations of dentists in fiction, film, and art are seldom of complex, human characters and, moreover, are almost solely images of violence or humor.

So, we return to the question which opened the paper: \textit{Why} do these images persist? The preceding accumulation of examples may begin to offer an answer. They tend to include three components: pain or the threat of pain, helplessness or a sense of helplessness, and violence or the threat of violence. By including the \textit{threat} of violence or pain and the \textit{sense} of helplessness, the imagination is often more powerful than reality. Imagination can even cause misperception of reality. All this helps create in the patient fear and defensiveness — toward one's own experience of pain as well as toward those who will play a part in treating (read "creating") that pain. However important teeth may be, people probably never see toothache as life-threatening. Thus, the special fears created by dental care prompt many people to picture dentists as evil, sadistic, silly, or inept — in order to justify their own anxiety or guilt. There is a need to rationalize or trivialize what is most threatening to us — to "prove" to ourselves that it is dangerous or to reduce it to inconsequence.

Janet Frame, a British novelist, has created one of the few multidimensional dentists in fiction, Russell Maude, in \textit{The Adaptable Man}, who enters dentistry because "I'm crazy over teeth." He soon realizes however, that most of the world doesn't share his enthusiasm. His explanation of
others’ attitudes summarizes many of the points raised here — and offers a fitting salute to the dentist:

He remembered his vigor, enthusiasm, the plans he had made for his future practice. He remembered the mockery that pursued him everywhere because he had chosen dentistry. He realized that the people’s attitude toward dentistry was as complicated, deep-seated, irrational as their numerous racial and religious hatreds. Dentistry was something vaguely indecent, unworthy, undramatic; centuries of pain, fear, the horrifying inevitability and finality of teeth had caused man to look upon his dentist as material for comedy; perhaps, in a way, that was the highest tribute that could be paid.16

REFERENCES


DR. POIRIER is an assistant professor of Literature and Health Care, Center for Educational Development, College of Medicine, The University of Illinois at Chicago. Her address there is Center for Educational Development (M/C 591), 986 College of Medicine East, 808 South Wood Street, Chicago, IL 60612. Requests for reprints should be made directly to the author.
The History of the Characteristic Japanese Wooden Denture

Tokyo, Japan

Dentures, either full or partial, and constructed of wood, were introduced in Japan in the early 16th century. Relying on adhesion for retention, they were remarkably functional and esthetic.

Japan is the birthplace of the wooden full denture, the immediate predecessor of the dentures made today. Around the beginning of the 16th century, 200 years before Pierre Fauchard constructed his full dentures, Japanese wooden dentures had already reached a highly sophisticated stage of development; they were not only esthetically acceptable but also functionally adequate.

They were made by taking an impression of the mouth in bees-wax, and then making a model of harder, tinted, bees-wax. To fit this model the denture was carved by the meticulous manipulative skill accorded traditional wooden sculpture. In the beginning, the entire denture, teeth and all, were carved from one block of wood. In later years, human teeth or pagodite, ivory or animal horn was carved and inlaid into the denture to improve esthetics.1,2,3,4

With the coming of Commodore Perry and the opening of Japan to the West, western dentistry was introduced into Japan in the mid-nineteenth century. Vulcanite dentures and traditional Japanese dentures co-existed towards the end of that century; however, the latter gradually disappeared around the turn of the century.

THE EVOLUTION OF THE FULL DENTURE

Figure 1 shows a set of complete dentures for the upper and lower jaws that were exhumed from a tomb in Switzerland dating from around 1500 A.D. The artificial teeth are carved from bovine femurs in a very primitive fashion.

Fig. 1. Complete dentures made of bone, Swiss, early 16th century. (From Proskauer and Witt Bildgeschichte der Zahnheilkunde.)
The dentures are joined together at their distal ends with leaf metal springs to produce a repelling force that keeps them in the mouth.

If this denture were inserted into the mouth its masticatory efficacy must have been critically questionable. One can easily imagine that these were made chiefly for esthetic purposes.

In 1728, Pierre Fauchard, the founder of modern dentistry, described in great detail a method of constructing complete dentures in his brilliant *Le Chirurgien Dentiste*. His full dentures, however, were somewhat primitive with teeth carved from animal bone and aligned on a metal frame (Fig. 2). And just as were the complete dentures found in Switzerland, they too were held in the mouth with leaf metal springs at their distal ends. Unlike Japanese wooden complete dentures, or present-day full dentures, they were simply a continuous alignment of dentiform carvings with slightly wider bases. Dentures in Europe had thus undergone little development from the 16th century up to the middle of the 18th century.

THE JAPANESE WOODEN DENTURE

In Japan, a prosthesis with two consecutive teeth carved from bluish yellow pagodite was excavated from an ancient tomb in Koto County, Miyazaki Prefecture, on Kyushu Island, while another with four consecutive teeth was discovered in an old burial mound in Himi County, Toyama Prefecture, in northern Japan. These articles date the beginning of dental prosthetic restoration in Japan to the Nara period around the 8th century, A.D.

In 1978, Dr. Yasuo Ishii, then assistant professor of oral surgery at the Faculty of Medicine, Kyoto University, discovered a complete upper denture
used by a Buddhist priestess, Hotokehime ("Princess of Buddha", Nakaoka Tei being her secular name). She is said to have died in 1538 at the age of 74. The denture found among her belongings was a totally wooden prosthesis that had been fitted to, and supported by, the mucous membranes of the upper jaw. This full denture is not drastically different in either form or function as compared with present-day full dentures, and was quite serviceable in its day. (Fig. 3).

**Fig. 3. Complete upper wooden denture dating from 1538 and found in the tomb of the Buddhist priestess Hotokehime.**

**SIMILARITY OF PRINCIPLES OF DENTURE CONSTRUCTION**

Wooden dentures were commonly made of boxwood, plum or cherry trees. Originally, the denture was carved from one block of wood but after the Edo period other materials were being incorporated into the denture, such as ivory, bovine bone, horn, giant clam shells and extracted human teeth.

The striking characteristics of denture construction in those days was the use of a broad base to hold the denture in place. Attention was thus already given to the principle of adhesion, (or suction), between objects. The construction of these dentures was amazingly advanced, the denture fitting the alveolar oral muscosa well and allowing for good articulation with the opposing teeth.

In the West, according to Weinberger, the discovery of the retention of upper dentures by adhesion didn't come about until about 1800 when James Gardette of Philadelphia utilized this principle in constructing his dentures. 

**OTHER EXISTING WOODEN DENTURES AND THEIR USERS.**

Before the discovery of Hotokehime's denture, the oldest-known wooden denture was one made of boxwood for the lower jaw and used by Hazama Yajibeijoshin (died at the age of 60 in 1673), and which was found in 1926 at the Katsueiji Temple in Osaka. Natural human teeth were incorporated in this denture.

Another complete boxwood denture dating from the same period, but with teeth made of pagodite, was excavated in 1927 from the tomb of Munefuyu Yagyu (died 1675) at the Kotokuji Temple in Shitaya, Tokyo.
Yagyu was a feudal lord, the third successor of the Yagyu Shinkage school of sword exercise and an instructor for the family of the shogun. The discovery of this denture created such a sensation that it inspired the popular writer, Kosuke Gomi, to write Yagyu Bugeicho, a famous novel.

Fig. 4. Wooden full upper denture with ivory anterior teeth. Mid-18th century. (Courtesy Museum of the Tokyo Dental College.)

More recent examples of wooden dentures include a boxwood denture with pagodite teeth for the upper jaw worn by Yamamoto Bunemon Yukikata (died 1786); a multi-unit wooden partial denture used by Kajino Heikuro (died 1806); wooden dentures for both the upper and lower jaws used by Heikuro's wife (died 1812); a wooden complete upper denture worn by Hoin Oka Sessai, doctor for the shogunate (died 1848); and a multi-unit partial denture for

Fig. 5. Wooden upper partial denture worn by Squire Tamaki (died 1858). Note the ingenious dovetailed retention of the anterior ivory teeth and the nails driven into the posterior region for better chewing efficiency.
the upper jaw used by Tamaki Heizaemon, a squire in Niigata Prefecture (died 1858) Fig. 5).

WIDESPREAD USE OF WOODEN DENTURES.

Between 200 and 270 complete and partial wooden dentures have been discovered in Japan. The actual total, however, is unknown because the dentures are scattered throughout the country. In addition, there are many wooden complete dentures that are no longer in existence but are referred to in the works of literature. One is that used by Motoori Norinaga, a classical Japanese scholar during the late Edo period. In 1796, he received a complete set of wooden dentures from a denture maker in Tsu. Delighted that he could chew easily again, Norinaga sang of his joy in a poem:

All of a sudden,
An old decayed tree is covered
With young leaves again
Even after spring has gone.

This poem offers clear proof that Japanese wooden denture had enough masticatory function.

Takizawa Bakin, another famous author in the late Edo period who wrote the epic novel *Satomi Hakkenden*, received a complete set of wooden dentures in 1827. Four years later, at the age of 61, Bakin paid denturist Yoshida Genpachiro one bu (about 8,400 Yen) to repair several broken artificial teeth. This transaction is described in his *Bakin Nikki*, an essay in the form of a diary.

RELIGIOUS WOODEN CARVINGS AS FORERUNNERS OF THE DENTURE.

The casting of gold-copper alloy statues of the Buddha by Korean technicians employing the disappearing wax technique had begun in Japan during the early 8th century. Towards the end of the Nara era (the end of the 8th century), wooden carved statues of the Buddha began to replace the cast ones. It is conceivable that wooden carved dentures were originated by those sculptors as a side-line, because of their skill in carving the Buddha's statue, and their familiarity with the use of bees-wax. In addition, there were more wooden denture-wearers in that early era among those who practiced Buddhism. In the early Edo era, there were some denturists who, at the same time, were carvers of the Buddha's statue. However, towards the middle Edo era, professional denturists practiced in large cities like Edo (present-day Tokyo) and Osaka.

WHO MADE THE DENTURES?

The physicians and dentists in the service of the Imperial Court and the Shogunate specialized in treating the mouth, teeth, larynx and pharynx, but as a rule did not construct dentures. Instead, a new type of craftsman, the denture maker, emerged in response to the needs of individuals wishing to replace their lost teeth.

There is a variety of competing views concerning the originator of wooden dentures. One popular view holds that Tanba Suemoto (1249-1323) devised the wooden denture during the middle of the Kamakura period. This interpretation is based upon an existing portrait of Suemoto on a scroll, annotated, "... an edentulous man with dentures." Yet this view lacks credibility since
there is no evidence that the term "dental prosthesis" existed during the Kamakura period. Moreover, the original portrait was destroyed by fire, and the existing work is a reproduction by Takayama Kicsai (1850-1931), founder of Takayama Dental College, and is based upon a portion of the portrait which survived the fire (Fig. 6).

Another view attributes the wooden denture to Tanba Chikayasu, a skillful craftsman in Shijo, Kyoto, based on a reference in the fourth volume of the Kanden Kohitsu by Ban Kokei. In 1520, Tanba retired from public life as court-dentist and opened a shop for dentures and other handicrafts. But this, too, is questionable, since it would mean that Tanba's shop opened only 18 years before Hotokehime's death. Hotokehime is said to have carved her own denture by copying a denture used by another person. If this is true, it must be assumed that complete and partial wooden dentures had reached nearly perfect forms in Japan by the mid-to-late sixteenth century. It is surprising that individuals without any knowledge of dentistry would think of constructing wooden dentures. And it is particularly miraculous that as early as the sixteenth century, they had developed a technique which was not conceived in the West until the end of the eighteenth century.

Thus, before the Edo period, wooden dentures were probably constructed by Buddha's statue sculptors who were skilled in all phases of woodworking. But the making of wooden dentures also required other special techniques for giving consideration to the practical functions of appearance, speech and mastication. One of these was the use of small nails, called kenpin, to prevent wear and tear of the posterior region, which normally was not carved, as well as to aid mastication. (Fig. 7)
THE METHOD OF WOODEN DENTURE CONSTRUCTION

A bees-wax disc with a diameter of 7 cm. and about 8 mm. in thickness, was softened in warm water, inserted in the mouth and pressed against the edentulous ridge. It was then chilled in cold water. A harder type of bees-wax, molten and tinted, was poured into the impression to make a positive die. Horizontally cut box-wood was boiled for 24 to 48 hours and stored in cold water. This block was then cut into two pieces and the circular side was used for the anterior ridge. After an approximate mucosal morphology was carved, it was pressed to the positive die and painted with vermilion to identify the pressure points to be carved. This procedure was repeated several times, and then tried in the patient's mouth which was similarly painted with a red disclosing pigment. After achieving an accurate fit of the plate to the mucosa, the shape of the anterior plate and the front teeth was carved observing both functional and esthetic aspects.

Human teeth, ivory, animal bone, marble tips, etc. were filed to conform to the shape of the carved wooden anterior arch. Then the teeth were perforated horizontally by a mesio-distal hole for a retaining ligature wire or shaped so as to be held in place with dove-tail retention. Originally the molar portions were left uncarved, much like a wooden platform. Later, copper or iron nails were driven into them to prevent breakage and to enhance masticatory efficacy. Sometimes metal strips were also used for the same purpose.

The dentures were filed roughly by shark skin and polished with Toxa or Muku leaves. For female clients, the tooth surface or the whole denture was stained black to make it resemble Ohaguro, the black staining technique adopted as a custom by married women who colored their natural teeth.

REFERENCES


8. Ring, M. E. Dentistry — An Illustrated History. St. Louis, C. V. Mosby Co. and


(This paper was presented at the 34th Annual Meeting of the American Academy of the History of Dentistry, San Francisco, California, November 1, 1985.)

DR. MORIYAMA, who is in private practice, is also a part-time lecturer in the Department of Microbiology, Tokyo Dental College. He also serves as a Regent of the Japan Society of Dental History. His address is 5-3-12 Hakusan, Bunkyo-ku, Tokyo 112, Japan. DR. HASEGAWA is Professor of Operative Dentistry and Head, Postgraduate School, Tokyo Dental College. Requests for reprints should be addressed to Dr. Moriyama.

Rare Books & Manuscripts in the history of Medicine & the Sciences
BOUGHT . SOLD . APPRAISED

Jeremy Norman & Co., Inc.
442 POST STREET
SAN FRANCISCO, CALIFORNIA 94102
(415) 781-6402
Almost unknown today, W.G.A. Bonwill was an inventor who made substantial contributions to the practice of dentistry and was highly esteemed during his lifetime both in this country and abroad.

Dr. W.G.A. Bonwill felt his most important accomplishment in dental science was his discovery of the tripodal arrangement of the mandible which formed an equilateral triangle. Bonwill noted that the distance from one condylar process of the mandible to the other was about four inches and that from each of the condylar processes to the midline of the mandible is also about four inches. He concluded that the average mandible forms a four-inch equilateral triangle. Dr. Bonwill reached this conclusion after examination of 4,000 dead and at least 6,000 living jaws.\(^1, 2\)

By using geometric principles, he determined that the size of the mandibular arch must just be 1/12 of the main circle drawn around the equilateral triangular jaw. By using a compass and straight edge ruler, Bonwill constructed smaller equilateral triangles within the larger one. Then by dividing certain line angles of the smaller equilateral triangles, he was able to arrive at the proper position of each tooth in the mandibular arch. Once this was accomplished, he would align the maxillary arch in relation to the mandibular arch. According to Bonwill, when geometric principles were followed, balance of teeth in lateral and protrusive movement would be attained.\(^3, 4\)

Wilbur F. Litch, editor of the Dental Brief, remarked that Bonwill in his later years no longer felt it was essential that a full understanding and acceptance of his geometric theories was necessary in successful prosthodontics. But he did believe that to master them for the pursuit of excellence was
a noble effort. However, even as late as 1899 Bonwill claimed that without his anatomical articulator no artificial dentures could be properly constructed.\footnote{5}

Many dentists who were contemporaries of Bonwill would probably have agreed with the above statements. In addition, however, a hundred years ago the name W.G.A. Bonwill would have meant also poet, statesman, scholar, ambassador, scientist, inventor, lecturer, sculptor, researcher, teacher and internationally renowned individual.\footnote{6} \footnote{7}

Born in Camden, Delaware on October 4, 1833, Dr. William Gibson Arlington Bonwill was educated in the Middletown Delaware Academy. From the age of 14 to 20 he worked at many trades. Because of this artistic ability as a sculptor, Bonwill became interested in dentistry when he saw carvings of blocks of teeth. At the age of 20, young Bonwill taught at Hick’s School House (between Burlington and Mount Holly, New Jersey) to earn money for his dental apprenticeship. He became a preceptorial student of Dr. Samuel W. Neall in Camden, New Jersey, for six months. This apprenticeship was followed by a three-month association with Dr. Chapin A. Harris of Baltimore, Maryland. His practice grew quite rapidly because of his personal magnetism and ability.

In 1866 Bonwill graduated from Pennsylvania College of Dental Surgery, and a few years later he received the M.D. degree from Jefferson Medical College. A few months later he moved to Philadelphia, Pennsylvania.

On June 13, 1861, Dr. Bonwill married Miss Abigail E. Warren of Dover, Delaware. They had three children: Dr. Edward W. Bonwill, who followed in his father’s profession; Mrs. Caleb Milne, Jr. of Philadelphia, Pennsylvania; and Mrs. Edward S. Gellarly of New York City, New York.

Dr. Bonwill was a member of numerous dental, medical, and scientific societies in the United States as well as in foreign countries. He was awarded a gold medal by the Franklin Institute of Philadelphia, Pennsylvania, for the originality and usefulness of his inventions.

In 1867 Bonwill designed the electromagnetic mallet for plugging gold foil. He also produced a mechanical mallet and invented dental and surgical engines. In 1897, Dr. Garrettson went so far as to say that Bonwill’s surgical engine ranked next to the discovery of anesthesia in its importance to the dental community!

In 1857 Bonwill was the first to shave very thin ribbons from gold blocks. This produced a thin gold foil which was packed into the prepared cavity of a tooth. He also invented boilers, burners, buttons for shoes, and improved on the safety pin.\footnote{8}

Bonwill always felt that his improvement of the articulator was his most important achievement. He claimed that with the aid of his articulator, he could construct an artificial denture which would perform every function of mastication as perfectly as the natural teeth. No one refuted this claim for almost forty years.

Dr. Bonwill was the first dentist to identify anterior guidance and to describe periodontal disease which results from traumatic occlusion.

It was said that the one hundred and fifty poems which Dr. Bonwill authored were as unique as his inventions.\footnote{9}

Dr. Bonwill was once asked by a colleague what he considered the highest honor ever paid to him during his career. Bonwill answered that it was during the 1899 International Dental Congress in Paris. The dentists in attendance enthusiastically lifted him upon their shoulders and transported him around the room amid boisterous cheers. He also commented that he had
never received any honors in his hometown, but added that he disdained the fact that his native city had disowned him. A number of times Dr. Bonwill traveled to England to present special clinics on various subjects and techniques including: the numerous uses of gutta percha in the dental practice; his method of "packing amalgam" (a term first used by him); Abbey's soft gold foil; his special method of clasping teeth in small removable partial dentures; the use of pointed fissure burs; and the designs of new handpieces and toothbrushes.

Dr. Bonwill had his opinions and theories — which up to 1900 had not been disproven — and no one, in his era, was able to prove him wrong in his arguments. All he would ask of anyone was that he be given the opportunity to defend his statements. After Bonwill's death, Dr. Howard B. Cressman of the Pennsylvania Dental School, Class of 1899, spoke for the many who knew Dr. Bonwill both as a friend and as a great scholar:

Some thought of him as a crank on account of his peculiarities, but did anyone ever see a genius that could not have been called a crank? No, for they walk hand in hand, the genius ahead of the times, differing from others, and therefore dubbed crank. He was a man who lived only for his profession, and it was his greatest pleasure to read letters sent to him by friends who understood and appreciated the great work he was doing.

As a preceptor, Dr. Bonwill was exact in all his work and nothing less than perfect would he accept. Under an exterior which some thought brusque was a charitable spirit, a great and good heart, and willingness to help others if they could show that they had, at first, tried to help themselves.

Both at home and abroad will be felt his loss, for the students who used to gather round him after his lectures always learned new ideas, and pleased him by asking questions.

As lasting as the profession will be the works of Dr. Bonwill, and may God rest "Our Little Father," as the Russians affectionately named him. Dr. William Gibson Arlington Bonwill died in St. Joseph's Hospital, Philadelphia, Pennsylvania on September 24, 1899 from a septicemia resulting from surgery to alleviate prostatic hypertrophy which was complicated by acute cystitis and chronic nephritis.

REFERENCES

DR. DiGIACOMO is in private practice. His address is Airport Plaza Shopping Center, Route 36, Hazlet, NJ 07730. Requests for reprints should be made directly to the author.
The Historical Development of Dentistry in China

— Yiming Li, D.D.S., M.D.S.
Shanghai, China
Baowei Zhang
Shanghai, China
Arden G. Christen, D.D.S., M.S.D., M.A.
Indianapolis, Indiana

China is a country which has experienced an exceptionally long, colorful history and culture. The development of dentistry as a profession can be traced back to the earliest period of Chinese history. This paper reviews some aspects of this historical development and briefly describes the current status of dentistry and dental education in China.

Descriptions of various dental problems and their remedies have appeared in the oldest historical literature and records, including inscriptions on bone. In the Han Dynasty, almost 2,000 years ago, a specific medical book dealt with the description and treatment of dental and oral diseases. During the Tang Dynasty, dental anomalies were combined with eye and ear diseases, to form a separate field. A number of specialized books on these topics were written during this period, including a classic medical book listing 22 dental diseases and 11 lip and tongue diseases. In the Song Dynasty, dentistry was separated from the eye and ear group, but still included among throat diseases. Sheng Ji Zhong Lu, the most comprehensive medical book, appeared in the Song Dynasty. It included 5 volumes devoted exclusively to dental problems.

RECOGNITION OF ORAL DISEASES

Historical records indicate that oral and dental diseases have been present in man for thousands of years. Inscriptions on turtle shells and animal bones of the Shang Dynasty (1600-1066 B.C.), unearthed in 1899, already made reference to them. Bone carvings show that emperors of the Shang Dynasty suffered from tooth disease and that they prayed to the gods for relief. Similar inscriptions have been found on other ancient artifacts, indicating that dental diseases were not a rare problem in those times. The first and oldest Chinese medical book, Huang Ti's Internal Classics (Nei Ching), devotes two chapters to many records and descriptions relevant to dentistry. Said to have originated from the times of Haung Ti, the Yellow Emperor (who reigned from 2696-2598 B.C.), the book is attributed to him, although it is believed to have first appeared during the years just before the first century A.D. Although the ancient Chinese excelled in medicine and dentistry, they considered dissection to be sacrilegious. Chinese medicine was somewhat intermingled with magic. The five organs — the liver, heart, spleen, lungs, and kidneys — were paired to the 5 elements, wood, fire, earth, metal and water. In this important book, oral diseases, thought to be caused by an imbalance of cold and warmth in the body, were classified into three categories: Fong Ya, inflammatory diseases; Ya Gan, diseases of soft tissues; and Chong Ya, dental caries. Interestingly, even at this early time, this book had already mentioned the direct relationship between excessive sweets and dental caries. The author advised that restricting intake of sweets and cleaning food debris by oral rinsing after meals was beneficial in preventing den-
tal caries. These opinions are still widely accepted by Chinese people today. The importance of prevention of dental diseases was further emphasized, stating: “This is why the sage treats unset diseases and resolves unformed problems. If treatment is only offered after illness and the action is only taken after rebellion, it is just like having to dig for water when you are thirsty or to make a weapon in front of the enemy. Isn’t this too late?” The developmental stages of human dentition and its relationship to age and sex were also observed. The descriptions given in the book are fairly comparable with those found in modern dental textbooks.

Up to 400 A.D., many oral diseases had been recorded and described in the Chinese literature, including toothache, dental caries, periodontal diseases, gingival recession, gingival bleeding, tooth discoloration, trigeminal neuralgia, and cleft lips. Most of these records described the signs and symptoms of the diseases and disorders as well as the prescribed treatment. The explanation for the etiology of dental diseases, however, was largely based on imagination. For example, dental caries were thought to be caused by “tooth worms”, and cleft lips were believed to be a result of eating rabbit meat during pregnancy. In the book Sheng Ji Zhong Lu, published in 1118, discussions of oral and dental disease occupied five entire volumes. They included almost all oral diseases presently known to modern dentists.

ORAL HEALTH MAINTENANCE

Since the earliest era of Chinese civilization, a variety of methods have been used to maintain optimal oral health and to prevent dental problems. They include mouth rinsing, toothpicking, toothknocking, tongue cleaning, and toothbrushing.

Mouth rinsing, particularly after meals, is an old Chinese custom which is still widely practiced. One of The Five Classics, the Book of Rites, which was written during the Zhou Dynasty (475-221 B.C.) already mentioned that one should “Rinse the mouth when the cock crows.” Recommended mouth rinsing solutions included saline, tea, wine, vinegar, and horse urine. It was already recognized that rinsing with tea could prevent tooth decay. Later, Chinese people realized the importance of rinsing their mouths before bedtime. In a book entitled Jin Dan Quan Shu we read: “It is a wrong opinion that the mouth should be rinsed only in the morning. The food debris from the whole day accumulates between one’s teeth. Therefore, if rinsing is done in the evening, the teeth will not become decayed. To best protect teeth, rinsing in the evening is wiser and more effective than rinsing in the morning.”

The earliest historical record of toothpicking appeared in a letter between brothers in the Jin Dynasty (265-420), although there is no specific description of the toothpick which was used. During the Song Dynasty (960-1279), and thereafter, the toothpick was popularized and eventually became a member of a toilet set.

Toothknocking, a unique, ancient Chinese oral health practice, consisted of rapidly and forcefully biting one’s teeth together. Ge Hong, a Jin Dynasty (265-420) scholar, recommended that one should “practice toothknocking 300 times every morning.” A Tang medical book (618-907) said that toothknocking performed 36 times each morning would prevent tooth decay and loss. However, this method has never been popular in modern China.

According to a book written by Chen Zi-Ming in 1237, tongue cleaning was also a common oral health practice. However, the tool and the method utilized were not specified.
The first recorded use of a toothbrush is attributed to the Chinese during the Tang Dynasty (618-907). In addition, a number of medical books written during the Tang and Song Dynasties discussed materials to be used in conjunction with the toothbrush. Saline was the first substance used, with different combinations of herbs subsequently brushed on the teeth for therapeutic purposes. However, the material and processes utilized in the construction of the first toothbrush are unknown; hog bristles or horsehair embedded in ivory are believed to have been used. Between 1953 and 1955, Chinese archaeologists unearthed a Liao tomb belonging to an emperor’s son-in-law, where they found two ivory toothbrush handles. There are 8 holes in the head of the brush, arranged in 2 rows. The holes are larger at the side facing the bristles and smaller at the back. The bristles have already disappeared in this specimen, but indentations made to hold the string can be identified at the back side of the head. Apparently the string was used to position the bristles in place. The measurement of these two brush handles indicates remarkable similarities to the modern toothbrush. In addition, when unearthed, the handles were found inside a ceramic sink with a cup, strongly suggesting that these objects were indeed toothbrushes. The tomb containing these artifacts was determined to be constructed in about 959 A.D., more than 1,000 years ago. Literature written during the Song Dynasty (1189) indicated that toothbrush bristles were made of hair from a horse’s mane. Adverse effects caused by incorrect toothbrushing methods were also mentioned in these ancient writings.

Similar to recognizing the importance of pre-bedtime mouth rinsing, the importance of brushing teeth before bed time was acknowledged later by the Chinese. In 1330, Hu Si-Hui, a Yuan Dynasty scholar, recommended that an individual brush twice daily, morning and evening.

ORAL MEDICINE

Early Chinese medicine recommended careful examination of the tongue as an aid in diagnosis. The changes in the tongue’s appearance, first described in Nei Ching (Internal Classics), were believed to reflect the severity and prognosis of disease.

Hua Shou, one of the great early Chinese diagnosticians of the later Han Dynasty (25-200 B.C.), described the whitish spots in the mouth as a premonitory symptom of measles. Later, in the eleventh century, two investigators, Fing Totung and Yu Shu, accurately described the entire process of chewing and swallowing. Confucius believed that all diseases enter through the mouth.

Shen Nung, the Red Emperor, compiled the first medical herbal treatise in his book of Materia Medica called Pen-Tsao. He tested 365 different medical herbal preparations on himself, including aconite, arsenic, rhubarb, mercury, sulphur and animal excreta.

ORAL SURGERY

Oral surgery procedures are mentioned frequently in Chinese historical literature, including tooth extraction, oral tumor removal, and cleft lip repair.

Although the first Chinese record of tooth extraction is found in a book compiled in the Sui Dynasty (610), the methodology of extraction is not detailed. In another medical book of the same period, an herbal powder is described as being used for tooth extraction. This so-called “coughing up” technique...
que, is still utilized in remote areas on extremely loose teeth. Initially, the powder is placed around the tooth, and several minutes later the patient is asked to "cough". Theoretically, the tooth will automatically fall out as a result of these combined actions. In ancient China, tooth removers practiced in the streets, with strings of extracted teeth displayed as a testimony to their success rates.

The earliest case of oral tumor surgery was reported by Yan Yong-He, in 1253 (Song Dynasty). He described the appearance of a tumor on the palate, the surgical procedure used for its treatment, and its post-operative management. However, he did not mention the anesthetic method used. As early as 220-280, an herbal anesthesia was already utilized, but not for dental purposes.

The first operation designed to repair a cleft lip was performed during the Chin Dynasty (255-206 B.C.). A more specific reference to this type of surgery can be found in the Jin Annals, compiled during the early part of the Tang Dynasty (627-650) under the supervision of Tang emperor Li Shiming. This data has been cited in a number of books and articles and translated into English. The patient whose case was reported in this article was named Wei Yong-Sheng. Born with a cleft lip, he lived from 317 to 419 (Jin Dynasty). The repair, occurring when the patient was 18 years old, was performed by the Governor's personal physician. The unnamed doctor handled the patient in a methodical manner, conducting a thorough physical examination, selecting a treatment plan and discussing with the patient the upcoming surgical procedure and post-operative management. The operation was designed to cut the edges of the cleft with a knife and to stitch the raw surfaces together. According to this written account, the surgery was successful.

In the second century A.D., the Chinese used arsenic to treat decayed teeth, probably to relieve the pain of toothache and to kill the pulp.

AMALGAM INTRODUCED TO RESTORE DECAYED TEETH

The first use of amalgam for filling of cavities has also been attributed to the Chinese. "Silver paste" was first mentioned in Su Kung's *Materia Medica* in 659 and later in 1108 in the *Takuan Pentsao* by Tang Shen-Wei. Li Shih-Chen, a famous pharmacologist and doctor (1518-1593) in the Ming Dynasty, recorded the components and application of the silver paste amalgam. In his book, *Compendium of Materia Medica*, published in 1578, Shih-Chen stated: "The method of preparation is to mix tin and silver-foil with mercury. It solidifies like silver when correctly mixed. The silver-jade which the magicians have is most possibly the same thing... It is also good for repairing decayed teeth." Several other medical books published in the Song and Ming Dynasties have also mentioned silver paste and its application for filling decayed teeth. A thorough review of this topic has been made by Chu. The ratio of the ingredients in the silver paste at that time was 100 parts mercury, 45 parts silver, and 900 parts tin.

PROSTHODONTICS

Very little mention of dental prosthetics can be found in Chinese history. However, a book written about 1200 in the Song Dynasty has discussed in passing the replacement of lost teeth and has recorded the clinician's name. It states: "Mr. Chen's technique is miraculous. He can replace destroyed teeth with new ones." Unfortunately, no information about the material and technique used by Chen An-Shang is available. Whether the replaced teeth
were artificial dentures or implants remain unclear. Similar records also have appeared in other literature written during the Song and Ming Dynasties. In 1270, when Marco Polo traveled to China, he discovered that “both the men and women of this province have the custom of covering their teeth with thin pieces of gold, which are fitted with great nicety to the shape of the teeth, and remain on them continually.”

ACUPUNCTURE

Acupuncture, employed as one of the remedies for the treatment of various systemic diseases, has played an important role in Chinese dental history. One theoretical basis for Chinese traditional medicine is the principle of Yang and Yin. Yang is identified with masculinity and heat. Yin, a feminine principle, is characterized by darkness and cold. Good health occurs when Yang and Yin are in proper balance. When the two are unbalanced, a needle is inserted into the proper spot along one of 12 meridians thus restoring equilibrium and arresting the course of illness. With a total of 388 acupuncture points spread throughout the body, at least 26 are used to combat toothache, and to attack gingival problems. A total of 116 points are believed to be related to oral diseases. During the past several decades, there has been a renewed global interest in acupuncture. This ancient remedy, still used in Chinese medicine and dentistry, is being revised and improved continually.

In ancient China, moxibustion was also employed. The practice, based on a theory similar to acupuncture, was often used as a supplementary curative procedure. Resembling cautery, moxibustion causes a localized inflammation. A preparation of the powdered leaves of the plant Artemisia vulgaris is piled on a precisely designated spot on the skin and burned. The leaves smolder and the ashes frequently leave a localized blister. Sometimes the plant powder is also applied on the handle of an acupuncture needle and burned in the same way. Since fire is Yang, it counters an excess of Yin.

DEVELOPMENT OF MODERN DENTISTRY IN CHINA

An initial milestone in modern Chinese dentistry was the establishment of the first dental school in 1916 at West China Union University in Chengdu, Sichuan Province. This missionary school, run by the United Board of Christian Colleges, was founded by a Canadian-born dentist, Dr. Ashley Lindsay. A number of American dentists from Yale, Harvard, Columbia, and several California universities also contributed to its initiation and served as faculty members for many years. By the early 1950's, 4 Chinese dental schools had been established and were maintained for approximately 10 years. Since the 1970s, the number has increased to 23 presently operating government-sponsored dental institutions. In addition, several independent dental schools have been created. In China, dental schools are affiliated with medical universities or colleges.

The Chinese dental curriculum differs from its American counterpart. Students who have passed highly competitive national examinations begin their studies directly after high school. Living on campus, they receive free room, board, tuition, and basic living expenses.

Most Chinese dental schools have a 5-year curriculum, but at least 3 programs require the students to study for six years. In general, dental students spend two or three years studying basic sciences with a major emphasis placed on dental topics. After successfully completing these courses, students begin their dental instruction. They are also exposed to various medical disciplines, such as internal medicine, general surgery, pediatrics, gynecology,
radiology, and traditional Chinese medicine. The purpose of this training is to prepare students to save human life while performing duties in an emergency room setting. After graduation, new dentists are assigned to a government-chosen post.

Many dental schools operate graduate training programs, which accept basic science applicants immediately after graduation, but which usually require two years experience in clinical practice for those students entering clinical fields. All applicants must pass specified examinations. Those accepted study for three years to obtain a Masters degree. Some dental schools also offer Ph.D. programs. In 1984, 23 Chinese dental schools listed 3,637 dental undergraduate students and 128 graduate students in attendance. The annual student acceptance rate is approximately 800.

DENTAL CARE SYSTEM IN CHINA

For several decades, the Chinese have been under a government-run “free health care system.” Citizens are not required to pay personal health care expenses, except for those treatments which are esthetic in nature, including prosthetic and orthodontic care. However, personal cost is still minimal. For example, in Shanghai, a set of full dentures costs about $8.

The city dental care system differs from rural care programs. In the cities, almost every factory and street area have health stations or clinics, but basic dental care is provided by district and municipal hospitals. Shanghai, with a population of 12 million, is composed of 10 districts and 10 counties. Here, at least one hospital provides dental care in each district, and a number of municipal hospitals have more comprehensive dental facilities. Another dental care network, the Dental Health Center, provides general dental care and treatment, particularly in operative dentistry, prosthetics and extractions. Because of the high density of population in Chinese cities and the relatively limited dental facilities and personnel, the hospitals’ dental departments are generally crowded with patients.

In the countryside, a commune (called a “Xiang” and having a population of 15,000 to 50,000 people) is the lowest level which offers dental care. Although the commune often has a clinic and a dentist, many of these practitioners are not trained by dental schools. Instead, they have learned their skills from older dentists through an apprentice system. The commune clinic generally gives basic dental care only, such as extractions and amalgam fillings. The patient needing more complex treatment is referred to a county hospital, which provides services similar to those offered at the district hospital level. Rural people, especially those located in mountainous areas, have more difficulty finding appropriate dental care.

SUMMARY

Dentistry has been a part of Chinese history for centuries. However, the development of modern dentistry lags behind many other fields. China, with a population of more than one billion people has approximately 10,000 dentists at the present time, representing 1.4% of the total number of health professionals. In 1982, the ratio of dentists to the population was 1 to 108,698. This limited number of dental professionals cannot yet meet the increasing requirements of Chinese society. However, through a great deal of professional effort and utilizing the government’s attention and financial support, the situation is rapidly improving. China recently established its first dental hygiene and dental assistant curriculum, and has also initiated preven-
tive dentistry programs. Increasing numbers of Chinese dentists are now studying in the United States and in other medically-advanced countries. It is predicted that the state of dentistry will rapidly improve in the near future, reaping great benefits for the Chinese people.

REFERENCES

The authors would like to thank Dr. Chongren Hung, Professor and director of the Shanghai Research Institute of Stomatology, Shanghai, China for his valuable suggestions and assistance in preparing this article.

(This paper was presented at the 34th annual meeting of the American Academy of the History of Dentistry, San Francisco, California, November 1, 1985).

DR. LI is currently a Ph.D. candidate studying at the Indiana University School of Dentistry. Before coming to the United States he was a member of the faculty of the Shanghai Second Medical University School of Dentistry in the Department of Dental Materials. DR. ZHANG is faculty member at the same University in the Department of Prosthodontics. DR. CHRISTEN is professor and chairman, Department of Preventive Dentistry, Indiana University School of Dentistry. Address requests for reprints to Dr. Li. His address is Oral Health Research Institute, Indiana University School of Dentistry, 415 Lansing Street, Indianapolis, IN 46202.

POETRY AND THE DENTIST

FIDEI DEFENSOR.

Oh! think not we have no feeling,
And that our hearts are frozen.
Judge not our cruel dealings
By the horrid work we've chosen.

No! we are not void of feeling!
Tenderest sympathy with you we share.
We cannot stem the chills a stealing
Up your back-bone to your hair.

Some one must relieve the aching;
Some one all your pearls restore:
Remember this while you are shaking,
When in the nerve-canal, we bore.

Temporary are your chills and shaking;
Permanent is the work we do:
Never more that fierce aching.
Now the dentist bid adieu.

—C. A. R.
Items of Interest, Vol. 8, 1886
From the collection of
Prof. Gardner P.H. Foley,
Baltimore, Maryland
Oddments in Dental History:  
Does a Garrulous Patient 
Justify a Higher Fee? A Case from 1862. 

—Malvin E. Ring, D.D.S.  
Rochester, New York

Every dentist, at one time or another, has had a patient who was difficult to treat. Either the patient cringed or squirmed or otherwise made operating a difficult procedure indeed for the dentist, or else he or she talked so much and so incessantly that the dentist was hard put to carry out his treatment. About a century and a quarter ago an English nobleman refused to pay his dentist’s bill, insisting that the charges were exorbitant, although at no time was there any indication that he was dissatisfied with the work performed. The dentist sued and in spite of a spirited defence which included sending a “fake” patient to the dentist’s office to inquire as to his fees, the jury found for the dentist. The account of the trial, reprinted from a London newspaper, appeared in Vol. 11, No. 5 of the Dental Cosmos for May, 1869.

LORD BROUGHAM’S DENTIST.

In the Court of Exchequer, on Tuesday, the case of Lows v. Lord Brougham was heard. This was an action for the amount of a dentist’s bill. The defendant paid 82 Pounds into Court, which he said was sufficient to satisfy the plaintiff’s claim. Mr. Millward, Q.C., Mr. Charles Russell, and Mr. Kirby appeared for the plaintiff; Mr. D. Keane, Q.C., and Mr. R. E. Russell for the defendant.

The plaintiff, Andrew Lows, was a dentist at Carlisle and Penrith, and he brought this action against the defendant, as executor of the late Lord Brougham, to recover the amount of the following bill, which was sent to his lordship on the 22nd of November, 1862: 21 visits and consultations at Carlisle, Brougham Hall, and London; repairing sets of upper and under teeth; two upper and two lower sets of artificial teeth, gold springs and swivels; brushes, powder, etc. — 157 Pounds, 10 Shillings.’

It appeared that the late Lord Brougham sought the services of the plaintiff in the autumn of 1862, and that during a period of four or five months he was frequently attended by the plaintiff and his assistant. When the account was sent in his lordship made some objection to it, and it remained unpaid until his death, when, on application being made for the money, the defendant refused to pay, on the ground that the charges were exorbitant. The plaintiff charged 40 guineas for each of the two sets of teeth, and 2 guineas for each of the attendances, amounts which were said to be moderate under the ‘embarrassing circumstances.’ The assistant said his lordship’s mouth was very sensitive, and that he was very impatient and petulant under the operation of the dentist, and the plaintiff mentioned that he sometimes conversed a good deal at the consultation, and would occasionally give an account of his early life.

In cross-examination he denied that the man whom he sent to Grafton Street, London, with a bill in November, 1862, told him that Lord Brougham had expressed his astonishment, and said he had no doubt that he (the plaintiff) had come to town to swindle him on hearing of his going away to Cannes. Several witnesses were called to prove that the charges were fair and proper.
Mr. Keane, on the part of the defense, said that his client felt bound, in justice to the memory of the deceased, as well as for the protection of the interests of his representatives, to resist the claim, which he believed extravagant and extortionate. In December, 1862, Mr. William Brougham wrote to the plaintiff for particulars of his claim, but received no reply, and in spite of repeated applications to the same effect the particulars were not sent until a few months before Lord Brougham’s death, which occurred in 1868. In consequence of the dispute, some one was sent, in December, 1862, to the plaintiff’s place at Carlisle, to ascertain his prices, and was informed that the cost of a complete set of teeth of the best kind was 25 guineas. This clearly proved, contended the learned counsel, that the plaintiff had grossly augmented his claim, and that the amount paid into court was amply sufficient.

James Carbett, the personal attendant on Lord Brougham for 28 years, was called to contradict the plaintiff with respect to some of the alleged interviews, and he said that his lordship was so impatient that he would never allow a dentist to remain long enough with him to do his work. When the bill was brought to him in December, 1862, he was very indignant, and sent off the plaintiff’s man very quickly.

A carver, named Joseph Scott, proved what the plaintiff’s prices were in 1862.

The following characteristic letter from Lord Brougham to his brother was read:

‘Here is the unintelligible bill of Lows’. He sent his man for a check, and I blew him up, refusing absolutely, and telling him I was utterly astonished by the charge, and should leave it to you to settle. It is beyond all endurance, and I am prepared to defend an action if he dares to bring one. I have no doubt that he came to town on purpose to swindle me in the hurry of my getting away. . . . All are well, but I am much disturbed by that villain, Lows. If he calls I shall not see him.’

Mr. Hepburn and Mr. Cartwright, the eminent dentists, gave evidence as to their charges, which were much below those made by the plaintiff.

After a prolonged absence, the jury returned into court with a verdict for the plaintiff — damages, 22 Pounds 10 Shillings beyond the amount paid into court.

THE BILL AS ITEMIZED.

Patient:

“It seems to me the bill should be
Proportionate to the work;
A dollar and a half seems rather high
For giving a tooth a jerk.”

Dentist:

“When you see the bill as itemized
’Tis none too large, I vow;
There is fifty cents for the jerking
And a dollar for knowing how.”

— St. Paul Pioneer Press, c. 1892
From the collection of
Prof. Gardner P.H. Foley,
Baltimore, Maryland

30
Tooth and Toothache in Norwegian Folklore

Kai Hunstadbraten, Dr. Odont.
Amot pa Modum, Norway

Peoples of all lands have developed elaborate folk beliefs concerning the teeth and their ailments. Some invoke the spirits, others utilize materials and medicaments which often brought relief to the sufferer. Here the author traces the folklore of the teeth in his native land.

Teeth have been of great importance to people in all times and this is evident from the folk traditions recorded in Norway as well as in other parts of the world. Teeth were especially important to people who lived on coarse, unrefined food and used their teeth as working utensils. Good teeth were considered as a sign of strength, good health and good mental powers. The canine teeth were of especial importance; magicians needed these for their witchcraft. The indestructibility of the teeth and their persistence after the disintegration of other organs of the body may have inspired man with awe and a conviction that the teeth were immortal and therefore contained supernatural force.

TEETHING AND FOLKLORE

When children had congenital teeth present at birth it was looked upon as either a good omen or an evil omen. If, in addition, the child was born on a Sunday, this was taken as a sign of something extraordinary.

The newborn child had to be protected very carefully before it had been christened and likewise before its first tooth had erupted. Otherwise it might be exchanged by the netherworld people, who were waiting to leave an abnormal child in its stead, a so-called "changeling." Perhaps the high mortality rate among infants in those days may explain this belief. The child must not be left alone and must not be called by name in this period, probably to prevent malicious supernatural beings from knowing its name and thus getting it in their power.

The eruption of the first tooth therefore was an important event, commemorated by the bestowing of a gift such as a farm, a forest, a sword, a ring, a garment and, in ancient times, even a slave. A domestic animal was probably the most common gift.

In order to allay the discomfort associated with teething, the child was given something hard to chew on, usually of bone, wood, horn, or a piece of violet root. The gums were rubbed, or the child wore a necklace of peony seeds as an amulet to promote the cutting of teeth, and which also served as a prophylactic against convulsions. Such convulsions were rather common, but feared nevertheless at the time of the eruption of the deciduous teeth. These so-called "teeth-spasms" were not a single well-defined illness, but stemmed from a number of maladies from which many children suffered, and the difficult cutting of the teeth was thought to be responsible for these complaints.

The eruption of the first tooth was looked upon as a prognosticator of the child's future, whether the tooth appeared early or late. In some places an early eruption was regarded as a good omen, in other places as an evil one.

Such inversions are rather common in folklore and ethnology. The same phenomenon is interpreted in completely different ways, which shows that in fact there is no real relationship, only an accidental coincidence.
The special care which has been taken in the disposal of shed deciduous teeth seems to indicate that these teeth were regarded as having some magical importance. It is likely that the incisor teeth, being the first to erupt and the first to be shed, would be looked upon as of paramount importance. The exfoliated tooth was put in a certain place during the performance of a special ritual, or it was thrown into the fire with an incantation. Early people invoked the fire, the Virgin Mary or even a mouse. This latter is based upon the association of the shed teeth with an animal which is known to have very strong, sharp teeth, hoping this will produce similarly strong and sharp succeeding teeth in the child.

In some places the shed teeth were thrown into the cellar or put in the wall. People took great care that other persons or animals should not take possession of the tooth and thus have the child in their power and hurt it by means of magic. A special Norwegian custom was to put the shed teeth into the seat of a chair carved from a large section of log, with the occlusal surface upwards. Perhaps these teeth were regarded as a symbol of the family living on the farm from generation to generation, showing the continuity. In some places the teeth were driven into other chairs or benches, into the child’s bed or into the chopping block.

LORE RELATING TO TOOTH MORPHOLOGY

Many beliefs were related to the color, shape and position of the permanent teeth. Persons with yellow teeth were thought to be strong and intelligent, but they were not to be trusted! White teeth were a sign of weak, good-humored people, who were trustworthy and reliable. Translucent or transparent bluish teeth were regarded as a sign of sickness. According to folk belief, the netherworld people had yellow, long and sharply-pointed teeth. Such teeth were looked upon as a sign of an evil temper. Handsome, intact and well-shaped teeth were regarded as a sign of a good and harmonious nature. Broad teeth showed a kindhearted and generous person. Large and strong teeth indicated power and good health.

Even the position of the teeth was thought to be a sign of a man’s nature and character. This was especially the case with the front teeth. Prognathism or other abnormal positions of the teeth were signs of magic. Diastemas have been regarded as a sign of good characteristics and success, and also indicated a friendly, hospitable and openhanded person. But in some places it was believed to indicate a mendacious person, unable to keep a secret. This was especially the case if there was a large space between the upper central incisors. And if the teeth were crowded, it was taken as a sign of stinginess. Special significance has been attached to the canine in folk belief. In Norwegian dialects this tooth has many names, and because of its close relation to the eye its extraction was thought to be dangerous to the eye.

TOOTHACHE TREATMENTS

In former times people believed in worms as the cause of toothache and dental caries. The tooth worm is mentioned in several Norwegian charms against toothache, and is described as red, white or gray. Treatment was aimed at dispelling it from the tooth. Fumigation by means of henbane seeds is a very old remedy. The seeds were heated and the arising vapor conducted into the mouth. The effect must probably be ascribed to the narcotic influence of the henbane seeds, while the white grain, springing out of the bursting seed, was considered to be the worm.
According to Norwegian and Lapp tradition there were nine kinds of toothache. The carious lesion was pricked with sticks of hardwood from nine different trees until bleeding occurred, and then the sticks were hidden in a place where it was hoped they would never be found, or they were driven into a tree. The nine names of toothache could also be written on nine slips of paper which were chewed and swallowed.

The remedies against toothache can be divided into two main groups: rational and magical. Rational remedies are those which we can understand and explain on the basis of our knowledge of physiology. The remedies not satisfying this definition belong to the group of irrational, or magical, ones. Some remedies have both rational and irrational components. Rational remedies have their effect in a physical or somatic way, while the irrational, or magical, ones work in a psychic or mental way. In this respect there is in principle no difference between the two groups; only a difference in the manner of operation.

The surest means of cure of dental pain consists in extracting the aching tooth. Among most peoples the blacksmith has been highly esteemed. He forged the tools and weapons that were needed, and he had in his service the fire sent from heaven. In his smithy he also had tools that could be used for extractions, the different sorts of tongs. Nevertheless, many remedies were tried before the sufferer paid a visit to the smith.

Red-hot needles and nails were poked into the aching tooth if there was an accessible opening. Or concentrated acids or caustics were applied in the cavity. Among the numerous remedies recommended against this malady, one in particular deserves mention, and that is tobacco, either put in the cavity of the tooth, in the ear of the opposite side to where the pain was, or in the armpit, or else the smoke was blown into the mouth. Other materials were placed in a carious tooth including birch bark, paper as well as resin and pitch. Salt was also used, sometimes mixed with pepper, butter or brandy.

It was well known that cooling of the aching tooth could soothe the pain. Water, through which the air from the forge bellows had been blown, was thought to have a special effect. Here we see the magical element: everything that had been in contact with fire, iron and steel had an immanent power according to folk belief.

Herbs were applied to the outside of the cheek, as well as being placed in the ear or in the tooth. Mouth washes with decoctions of herbs or the chewing of roots of herbs or bark of trees was also recommended.

By experience people learned that heating the cheek was an effective remedy against toothache, especially in the presence of swelling. For this reason different types of cataplasms were used such as a warm mush of oatmeal or hayseed gleanings in a sack. The Lapps burned punk in the cavity or on the outside of the cheek. They also used a heated root of a birch or a fiery red coin, on the cheek, on the lower lip or on the inside of the hand. Bleeding was performed in order to remove “impure” blood in some diseases. According to Norwegian tradition, a vein was opened under the tongue, in the thumb, behind the ear or in the neck in order to relieve the sufferer from toothache. The Lapps cut a vein in the lower jaw, or a vein between the ear and the eye depending on the site of the pain. The evacuated blood had to be burned or buried to prevent the birds from eating it. Nothing belonging to the human body should be possessed by other beings, for if they got hold of such parts, e.g. hair, teeth, fingernails and blood, they would be able to damage the owner.
Secretions from animals or human beings as well as complete small animals were used against toothache. One remedy consisted of splitting a serpent's head longitudinally and placing it on the gingiva; or the dried head of a serpent was placed on the aching tooth. Flesh of a serpent was eaten or the snake's tongue, covered with a cloth, was kept in the mouth. Fat of the hare was applied in the ear on the opposite side to that where the pain was situated. The Lapps held a small frog on the cheek while others licked a toad under the abdomen. In folk medicine excrements have commonly been used. Horse dung was boiled to mush, wrapped in a cloth and placed on the cheek. Or it was applied directly on the tooth. Excrements of hare and sheep have also been made use of as well as excrements from man.

**TRANSFERENCOf TOOTHACHE**

There is an old belief that toothache can be transferred to trees, especially to a tree shattered by lightning, or to a tree standing alone, or to one on the borderline between three estates, preferably in the shadow where there was neither sunshine nor moonlight. A little piece of wood was cut from the tree, usually on the northern side, and the tooth pricked with it, till there was some blood on it. Then it was brought back to its former place in the tree. The pain was thus transferred to the tree and the sufferer was relieved of it. There is an old belief that if anyone later cut down such a tree, he would suffer all the pain inoculated into it. As a consequence those "toothache-trees" usually reached a great age.

The piece of wood might also be taken from the northern wall of a house (where there was no sunshine), from the oldest house on the farm, or from a house which had been moved three times. They pricked the tooth or pierced the gums and then put it in a crack in the wall or in the lowest log of the house with some blood on it. It might also be thrown onto the roof. A newly cut and sharpened willow twig was used in the same way, but instead of being driven into a tree the chip was thrown into the fire. Sometimes people took a horseshoe nail and pricked the tooth with it. Then the nail was driven into a tree or into a cellar where there was no light. In other places the piece of wood or the nail was buried in the earth or at a crossroads. People also felt that a toothache might be transferred to a stone held by the ground, such as a boundary stone or a milestone, or to a dung heap, an ant hill or into water, preferably water running northward. And one may not speak or utter any sound during the performance of the ritual or look behind one out of fear and respect for the supernatural beings.

**CHARMS AND INCANTATIONS**

However, there were many charms and incantations to be said during the ritual of cure. The Lord's Prayer read three times backward; the number three has played an important part in magic and folk belief since time immemorial. The figure nine (3 times 3) was expected to have an intensified effect. The name of God or the name of the devil is mentioned in some cases in these incantations; others contain incomprehensible words and expressions. There are also charms in which a little epic is told about some biblical person.

By means of such incantations people tried to transfer the toothache to fire or water, to stock and stone, to wood, earth or root. Special words were "read in brandy" which the sufferer had to drink, or in the ember of the fireplace which was afterwards kept in the mouth. They pricked in the hollow tooth with things which had been in contact with a corpse, or in any way
had anything to do with death or the church: splinters or nails from a coffin; a needle that had been used for sewing shrouds; chips from a tombstone, the church wall, the church threshold, the church steps, the church door or the churchyard gate. Earth from the graveyard (preferably taken in the Midsummer Night) was applied to the tooth. And bones from the churchyard were also regarded as a very powerful and effective remedy.

Charms were written on a piece of paper with ink or with blood from the tooth, usually three, seven, or nine times. The paper was then placed on the tooth, chewed and swallowed without the sufferer knowing anything of the text, or it was burned or spit into the fire. Such charms were also written on pieces of “flatbread” which were eaten. Paradoxically, little recourse was had to appealing to saints for intercession. Norway contains few images of Saint Apollonia, the patron of toothache sufferers. In a church in West Norway there is a picture of St. Apollonia on the altar piece, and from East Norway we know of an incantation in which St. Agatha is invoked.

**ORAL HYGIENE**

An old remedy against loosening of the teeth was to wash one’s mouth with urine in the morning. However, water, sometimes with salt in it, was more commonly used for mouth washes. People brushed their teeth with crushed charcoal, chalk, salt and ashes of different kinds of wood such as birch, juniper, alder, hazel and chokeberry. Moreover toothpicks made of juniper or rowan wood were used after meals. In some places wood from trees shattered by lightning were preferred, and in other places people used stiff and rigid straws of sedge grass as toothpicks.

In earlier times the consumption of sugar was rather modest, and dental health fairly good. But as modern fare was introduced at first in towns and cities, and later into the rural areas, too, there developed rampant decay among the population. Toothache became a real scourge for children and adults alike.

People chewed twigs of different wood, e.g. alder, birch, elm and willow, or bark of elm and willow during the sap time, as well as bark of birch and roots of juniper. Roots of herbs as polybody, gentian, pea flower and angelica were chewed in order to give a good taste to the mouth and keep the teeth clean. The chewing of tobacco was looked upon by some as beneficial for the teeth, by others as harmful. The chewing of resin was fairly widespread, with the reddish brown hardened resin of spruce preferred.

**WERE FOLK REMEDIES SUCCESSFUL?**

The placebo-effect must be considered when we judge treatment of toothache in folk belief. It seems to be a result of the circumstances and belief in the ritual which accounted for success. It was also due to the expectations and the attitude of patient and therapist. Perhaps it may partly be explained as a kind of auto-suggestion. Moreover, we must not forget that in most cases of toothache, the sufferer will be relieved of his pain without any therapy at all, if he has the necessary power of endurance and there are no supervening complications. However, it must be emphasized that practically every remedy against toothache, in folk medicine, with the exception of tooth extraction, aimed solely at relief of pain. Consequently it was purely a matter of palliative treatment and not therapy seeking to get at the cause. For when the aching tooth was extracted and the cause of the pain removed, there was a healing of the adjoining tissues. But even in those cases there
is no complete restitution, as the tooth is gone, and there has occurred irreparable damage to the body.

DR. HUNSTADBRATEN is regional dental officer in the Modum and Sigdal Dental Health Authority. His address is N-3340, Amot, Norway. Requests for reprints should be made directly to the author.

On October 20, 1986 the new American College of Dentists biography of the late ADA Executive Director Emeritus Harold Hillenbrand was officially presented to ADA President Abraham Kobren and Mrs. Marie Hillenbrand, to whom the book was dedicated. The presentation occurred during the Memorial Service for Dr. Hillenbrand at the annual meeting in Miami Beach, Florida. (L to R) Norman Olsen, Dean of Northwestern University dental school and President, American College of Dentists; Mrs. Marie Hillenbrand; Clifton O. Dummett, University of Southern California professor of dentistry and Past President, American Academy History of Dentistry, who with his wife, Lois Doyle Dummett, co-authored The Hillenbrand Era. (See review of the book in this issue.)
Robert J. Nelsen and the Development of the High Speed Handpiece

—Jerry J. Herschfeld, D.D.S.
Bensalem, Pennsylvania

One of the more profound changes in the dental profession which has made the dispensing of quality dental care possible has been the invention of the high speed turbine handpiece. With the development of this highly sophisticated apparatus, dental restorations became easier to perform by the dentist, and easier to tolerate by the patient. The new high speed technology enabled the dentist to maintain more control over his operative procedures; consequently he was now able to perform more intricate procedures with greater efficiency and safety.

Among the first dental drills to be invented were the Bow-drill of Fauchard and the hand-crank device of B. Jourdain (1734-1816). John Greenwood (1760-1819) invented a foot-powered dental engine by modifying his mother-in-law’s spinning wheel. Many operators of the time preferred however to use hand and finger drills, some until almost 1900. Motivated to develop a more efficient tool, Von Lautenschlager (1803), Nasmyth (1829), Lewis (1838), Spencer (1848) and a host of other inventors contributed new and innovative devices. In 1864 G.F. Harrington patented a clockwork-driven dental engine in England and four years later George F. Green invented a foot-powered pneumatic engine which allowed the dentist to have one handed control of the drill for the first time. In 1871 an American, James B. Morrison received a patent for the first true foot powered dental engine. The drill head received the foot treadle’s power via a flexible shaft. The first continuous cord engine with compensating joints was patented by Bonwill in 1878. Advancing technologies were now being adapted to the needs of the dental profession. Large batteries were now being converted for use with dental engines. George F. Green, in 1872, demonstrated his “electric burring engine” at the meeting of the American Dental Association in Niagara Falls, but its effects were largely ignored due in part to its clumsiness.

In the years following, dentists such as Friedrich (1887), Kirby (1889), Routledge (1894) and the brothers Pieper (1895) built dental drills powered by electric motors. In 1888, a motor stand was produced by the Detroit Motor Company which was distributed by S.S. White. Soon dental units were being designed with the engine contained as an integral part, no longer merely an attachment to be hung from the wall or ceiling. As the design of the dental unit progressed, so did the design of the dental drill which was part of the unit. The Frenchman, Constant Doriot invented a handpiece to be used in conjunction with the continuous-cord dental engine which could rotate at a speed of 1500 rpm. In 1911 the Belgian, Emile Huet, developed an electric engine which rotated at a speed of 10,000 rpm.
During these next decades the electric dental engine was the dentist's most important tool. However, a revelation was now about to take place. A dental engine propelled by compressed air was described by the Swedish dentist, Ivar Norlen, patented in the United States in 1952 and introduced two years later under the name "Dentalair." The gear handpiece driven by an air turbine could reach speeds up to 60,000 rpm and had variable speed control on both the contra-angle and straight handpiece. Credit, however, for the invention of the first true all-turbine (gearless) handpiece is usually given to Dr. Robert J. Nelsen, during the time he worked in the Dental Research Unit of the National Bureau of Standards in Washington, D.C. It was an invention which would revolutionize dentistry.

After having served in the Navy during World War II, Nelsen went into private practice in Faribault, Minnesota. In 1947 he became Executive Officer of the Department of Dental Materials at the University of Washington. In 1950 after having engaged in some research on the panoramic dental X-ray, he became a research associate of the American Dental Association at the National Bureau of Standards. In 1953, Nelsen and his associates perfected a hydraulic-powered turbine contra-angle which could rotate at speeds of 61,000 rpm. The head of the contra-angle housed the turbine unit. Nelsen succeeded where others failed in that his handpiece would not overheat at high speeds. His handpiece was marketed under the name "Turbo-jet." By 1962, a survey by the American Dental Trade Association reported that between 94-96% of all American dentists were using a turbine contra-angle handpiece within nine years after its first introduction on the market. Dr. Nelsen returned to private practice in 1955 in Potomac, Maryland and eventually became Chief Collaborator in Research and Chief of Material Science and Clinical Studies at the National Institute of Dental Research some ten years later. Nelsen's pioneering efforts transformed dental practice and modernized the profession as few developments before it.

Reprinted here, in slightly abbreviated form, is the original article, "Hydraulic turbine contra-angle handpiece" as it appeared in the September 1953 issue of the Journal of the American Dental Association. The authors were listed as Robert J. Nelsen, identified as a Research associate, American Dental Association, National Bureau of Standards; Carl E. Pelander, a senior instrument maker at the National Bureau of Standards; and John W. Kumpula, who was a laboratory mechanic at the Bureau.

HYDRAULIC TURBINE CONTRA-ANGLE HANDPIECE

A high rotary speed enhances the efficiency of instruments for cutting teeth in operative procedures. The small diameters of the dental cutting tools make it necessary to turn the instruments at high rates of speed in order to obtain effective linear speeds for the removal of enamel. For example, a 7/8 inch (22.2 mm.) disk rotating at 1,000 rpm has the same linear or surface speed as a 5/32 inch (3.9 mm.) disk dental tool rotating at 5,600 rpm. Some dentists have been reluctant to use high speeds in many operations in the mouth because of the hazard to the patient. This danger is due chiefly to the high inertia of the revolving instrument.

This report describes a contra-angle handpiece containing a small turbine which is propelled by a high speed stream of fluid in a closed system. This handpiece was developed at the National Bureau of Standards in cooperation with the American Dental Association. Because of certain characteristics inherent in hydraulic systems, many of the objections to the use of high rotary speeds in cavity preparation can be eliminated with the use of this new instrument.
THE UNIT

The unit is shown in Figure 1. It consists of a mobile cabinet which contains a fluid pumping mechanism, a reservoir, a pressure switch, a solenoid valve and distribution lines. The contra-angle handpiece is connected to a flexible coaxial double tubing. The 3/8 inch inside tube carries the propellant fluid (water) under pressure to the contra-angle handpiece while the 5/8 inch outer tube carries the spent fluid back to the reservoir. The tubes join with the line directly from the pump and the line to the reservoir tank. The flexible rubber hose, which rests on the floor, is connected to a relay system by which the operator controls the fluid flow to the handpiece.

The unit is self-contained and needs only to be connected to an electrical outlet for operation. The fluid is stored in a reservoir tank and is used over and over; hence the unit requires no adjustment during its normal operating use. The pumping equipment is enclosed in a sound-insulated cabinet which minimizes undesirable noise during operation.

THE PUMPING MECHANISM

The pumping mechanism consists of a constant-volume pump close-coupled to a one-half horsepower electric motor. The output of the pump under no-load conditions is 1.6 gallons per minute. The fluid is taken into the pump from the reservoir tank above through the connection. The fluid is discharged from the pump into a line which leads to the contra-angle handpiece. The fluid from the handpiece is returned to the reservoir through a line. To stop the turbine, the operator steps on a tube. This force closes the pressure switch, completing the circuit and opening the solenoid valve, which allows the fluid to bypass the turbine through a line and return to the reservoir.

While the instrument is being used, the motor and pump operate continuously; the handpiece is energized as needed by the operator controlling the flow of fluid through the instrument as just explained. The motor is controlled by a switch located on the side of the unit.

THE HANDPIECE

The use of air or water as motive power for dental rotary cutting instruments is not new. Iseman in a United States patent secured in 1940 and Norden in a United States patent secured in 1952 both describe dental engines propelled by compressed air. In United States patents secured in 1878, 1877 and 1879, respectively, Straub, Wilkerson and Laurence describe different means of driving a dental engine by use of water as a propellant. Each of the engines was designed for the straight dental handpiece, and each required that a gear-type contra-angle handpiece be attached.
The handpiece is driven by a small turbine in the head of the contra-angle. The over-all size and shape of the new instrument are within the general proportions of the conventional gear-driven contra-angle handpiece.

The turbine has six notched blades fixed to the shaft and measures 7.5 mm. in diameter and 4.8 mm. in height. In the design shown in Figure 5, stainless steel ball bearings are used. A thin metal disk to direct the flow of water away from the bearings is mounted on the shaft at each end of the turbine (Fig. 5, A). The radial load on the shaft is taken by the two stainless steel ball bearings (Fig. 5, B) placed at each end of the turbine. The upper bearing fits into a collar (Fig. 5, C) while the lower bearing is a press fit into the end plate (Fig. 5, D). The axial thrust is taken on a sapphire bearing (Fig. 5, E) mounted in the cap screw (Fig. 5, F).

Various combinations of plastic bearing materials have been used in place of the stainless steel ball bearings, which proved rather noisy and harsh in this application. Figure 6 shows an expanded view of a turbine assembly using plastic bearings, A, and journals, B. Nylon, Teflon, Rulon and stainless steel have been used in combinations. The three plastic materials have a low coefficient of friction and were not lubricated while in use. Bearings of this material are much quieter in operation and give more satisfactory results than bearings of any other material used in this application to date.

The turbine shaft (Fig. 6, C) fits into the hollow shaft of the cutting instrument. A spring key attachment (Fig. 6, D) fits into a keyway in the instrument shaft and secures it to the turbine shaft. The centrifugal force developed by the rotating shaft causes this spring to lock the cutting instrument in place. When the shaft is still, however, it is relatively easy to attach and remove the cutting instruments.

**OPERATIVE CHARACTERISTICS**

Since the only rotating or moving element in this contra-angle handpiece is the turbine to which the cutting tool is directly attached, the vibrations due to the belt-and-gear driving mechanism of the conventional contra-angle are eliminated. The fluid passing over the turbine and shaft acts as a coolant. In spite of the high rotational speed developed, overheating of the instrument is prevented. Therefore, this instrument has a distinct advantage over the gear-type instruments which heat excessively at high speeds.
The rotational speed of the instrument depends on the amount of fluid which is forced past the turbine in a given amount of time. Also, the amount of torque developed by the turbine is proportional to the pressure of fluid passing through it. With the pumping mechanism previously described, 1.6 gallons per minute forced through the turbine produced a speed of 61,000 revolutions per minute. At this speed and with a 2 ounce radial load used against a Densco diamond instrument SC-6 (7 mm. in diameter and tapered from 1 mm. thick at the hub to a knife edge), an average of 4.2 mg. of tooth structure was removed per second from fresh extracted teeth. During this test it was found that a load of 3½ ounces on this diamond tool stopped it from rotating. This, in effect, means that if the operator were to press too heavily on the cutting tool or if the tool were to catch in a bind in some manner that would ordinarily be hazardous, this instrument automatically would stop rotating. For instance, a belt-driven diamond-cutting instrument will entangle in a rubber dam or will cut through it if it makes contact with it while it is rotating. The same cutting instrument mounted in the hydraulic handpiece will not engage the rubber dam to any extent because there is insufficient torque developed to enmesh or tear the rubber. When disks of larger diameter are used, the effective torque is lessened. This is not a disadvantage, however, because with the increased diameter of the disk, there is an increase in the peripheral speed of the tool which compensates for the reduced torque. The actual cutting rate remains approximately the same. With the largest disks an extremely light pressure on the tool is used. Also, the disks will stop rotating when the cutting loads are light, and in this way the safety feature of the instrument in maintained. Any of the cutting instruments used, including the 7/8 inch diamond disks, can be stopped while rotating at top speed (61,000 rpm) by placing a finger abruptly against the edge of the disk. The disk will stop immediately and will not injure the finger. As soon as the disk is released, the instrument will start rotating again. If excess pressure is exerted on the cutting tool and then released, no manipulation or adjustment of the instrument is required to start or stop the turbine.

The use of city tap water (about 40 pounds per square inch) to operate the turbine does not produce the same amount of torque and rotational speed that occur when the pumping unit is used. With tap water pressure one gallon of water per minute is forced through the instrument, and a rotational speed of 35,000 rpm and proportionally less torque are produced. The cutting ability of the instrument is considered not adequate when city water pressure is used.

It is extremely important that all the cutting tools used at these high speeds be accurately balanced. Any eccentricity or unbalance is apparent, as it causes vibration of the instrument and immediately produces an uneven wear on the cutting tool. The diamond instruments which have been used with this contra-angle handpiece show little sign of wear even though many old amalgam fillings have been removed with each of them. Silicon carbide mounted points and disks of medium grit used in this instrument were found to be highly efficient. The fine grit points, however, did not cut well. The silicon carbide points are less expensive than the average diamond instrument. Although they wear faster than the diamond tools, they retain their cutting ability as they wear, whereas the diamond instruments lose their efficiency as soon as they begin to wear.

With this handpiece the preparation of teeth in the mouth can be performed with considerably less strain on the operator because of the extremely light pressures used. The cutting tools do not climb or roll out of the cavity as do those used in the slower-rotating instruments. The greatest advantage of the instrument is in the making of extra-coronal preparations. For intracoronal preparations, the instrumentation advocated by Ingraham and Tanner is most suitable. The extremely rapid cutting rate of this instrument makes it uniquely suited for occlusal equilibrium procedures.

**PATIENT REACTION**

The patient’s reaction to this type of instrumentation has been varied. None have remarked that this method of cutting teeth was more unpleasant than the usual method. The speed at which tooth structure can be removed and the short time that
the instrument must be used are factors which enhance its acceptance by the pa-
tient. An insufficient number of patients have had cavities prepared with the instru-
ment to draw a definite conclusion regarding the patient reaction to the actual cutting
sensations.

LIMITATIONS OF THE INSTRUMENT
Because of the extremely rapid rate of cutting, this contra-angle handpiece does
not lend itself to every type of rotary instrumentation. It is doubtful if the instru-
ment can be used effectively with diamond or silicon carbide cutting tools smaller
than a no. 560 steel bur (1.8 mm. in diameter). The various types of carbide burs did
not cut tooth structure with any practical efficiency when used in this instrument.
It is believed that the design of the cutting blades of all burs will have to be modified
before they can be used at the rotational speeds of this instrument.

SUMMARY
1. The advantages of using increased rotary speeds in tooth-cutting procedures
have long been recognized.
2. The operational hazards attendant on the use of high rotational speeds with
conventional belt-and-gear-propelled cutting tools have been considerably reduced
by the development of a hydraulic turbine contra-angle handpiece.
3. Rotational speed of 61,000 rpm with considerably higher cutting rate and lower
cutting pressure than can be attained with conventional instruments is now possible.
4. The mechanical difficulties of excessive vibration and heating characteristic of
the gear-type contra-angle handpiece have been eliminated by positioning the tur-
bine in the head of the new instrument. Therefore, no gears are required.
5. Milling cutters such as steel and carbide burs of current design do not func-
tion well in this hydraulic handpiece. Grinding tools such as silicon carbide and dia-
mond points and disks used with the handpiece cut with exceptional efficiency.
6. Even though some adjustment in the dentist's operative procedures is necessary,
the instrumentation is basically the same as his present methods. Therefore, the use
of this equipment will require no special training.

DR. HERSCHFELD is in private practice. His address is 3101 Bristol Road,
Bensalem, PA 19020. Requests for reprints should be made directly to the
author.
Developments in Prosthetic Dentistry in the Nineteenth Century

— Cornelius C.T. Yap, Dental Surgeon
London, England

The 19th century saw the growth of 'mechanical dentistry' and developments in materials technology which accelerated the advance of prosthetic dentistry. By the second half of the century inventions or patents application that were successful received much publicity and were subsequently recorded in journals of the period. Professional camaraderie, in terms of the sharing of acquired knowledge and critical appraisal, ensured progression and a learned evolution in prosthetic dentistry.

It appears that the first attempt to apply an inorganic material to the construction of artificial teeth was made by Jacques Guillemeau in the 16th century. Subsequently no further developments seem to have been made until that recorded by Duchateau, a Parisian apothecary, and Nicholas du Bois de Chemant, a dentist, at the turn of the 18th century. Duchateau had been experimenting to produce a mineral paste that could be used for the production of porcelain dentures as an alternative to the foul smelling ivory. Joseph Audibran, a Parisian dentist, reported that a successful firing was carried out by the Guerhard porcelain factory in Sevres, Paris in 1774. These findings were submitted to the I'Academie Royale de Chirurgie de Paris in 1786. Duchateau's subsequent attempts to use this invention and other patents failed because of his insufficient training in the dental field.

De Chemant, a Parisian dentist, succeeded in eliciting the formula of the mineral paste from Duchateau and subsequently published the details in Dissertation sur les avantages des nouvelles dents et râteliers artificiels in 1788. Publication of the article brought de Chemant financial rewards and honours from the Societe Royale de Medecine which led to a certification by Vicq d'Azyr, the secretary of the society (and one of the first anatomists to describe the premaxillary bone), in 1788. De Chemant then obtained an English patent on May 11, 1791 and the French patent on September 6 of that same year. He maintained a monopoly on the method of fabrication and sold the idea to other practitioners in return for the promise of secrecy. Jean Baptiste Gariot in 1805 condemned the secrecy in Traite des maladies de la bouche.

The increasing momentum of the French revolution and disagreements with Parisian dentists influenced de Chemant to move to London in 1793. There his dentures were much acclaimed. The popularity of mineral paste dentures was demonstrated by Thomas Rowlandson's coloured copper etching, "Caricature of Dubois porcelain dentures" done in 1790. The English patent mentioned "Alicant Barilla" and "Caholin of Limoges", indicating the materials of French origin. Between 1800-1801 de Chemant requested mineral paste from Messrs. Josiah Wedgewood & Sons of Stoke-on-Trent. There also appeared to be an infringement of the English patent by Messrs. Wedgewood, as other dentists in England had access to the supply of mineral paste. Thomas Fox, the first dental surgeon appointed at Guy's Hospital and Robert Blake, a medical practitioner in Edinburgh, were among the few using mineral paste from Stoke-on-Trent during this period.

The tide of opposition in France toward de Chemant's secrecy culminated in a court action by a group of Parisian dentists in the early part of the 19th century. This was recorded by C.F. Delabarre's Traite de la partie mechanique de l'art du chirugien dentists in 1820. The suit was lost and in retaliation the
Dubois de Chemant furnace in Sevre was demolished. The furnace was subsequently rebuilt by Jean Darcet, the director of the factory at the time.

With the expiry of the French patent, Jean-Joseph Dubois Foucou — who had been court dentist to Louis XVI, Napoleon, Louis XVIII and Charles X — bitterly opposed the stranglehold imposed by de Chemant; he now began freely to experiment with newer formulations. He modified firing temperatures and mixtures and fabricated dentures in three different shades. These involved the addition of coloured metal oxides of blue-white, grey-white and yellow-white.

The next important step was taken by Giuseppangelo Fonzi in Paris during the early part of the 19th century. Most practitioners during this period who knew of de Chemant's technique were using a single firing for the porcelain denture and teeth. In 1808 Fonzi published *Rapport sur les dents artificielles terro-metalliques*, describing a method for the manufacture of individual teeth employing "crampons", which were platinum hooks embedded in the porcelain and fired simultaneously. These teeth were known in France as "dents terro-metalliques" or "calliodontes" from *dents de caillon* or flint teeth. In England however, they were known as "French beans" due to their unsatisfactory shape, composition and means of attachment.

In 1837 Claudius Ash, a London silversmith collaborated with an Irishman, Joseph Corbett of Cork to produce the "gold tube tooth". These teeth had a gold tube inserted in their centres after firing when holes were specifically reamed. Platinum tubes were later used. Attempts to modify the retention of the teeth to the bases were subsequently improved upon by Messrs. Ash & Co. In 1850 "flat-back porcelain teeth" with short pins or a platinum bar were used for attachment to metallic bases. These appeared to be used until the arrival of the vulcanite base. Between 1858 to 1870 Claudius Ash & Co. were making teeth specifically for attachment to Vulcanite denture bases. A "dove-tailed diatoric" was accepted as the best design during this period. Flat-back teeth were subsequently adapted for use with Vulcanite by extending the pin and bending the end into a hook, or by the creation of a serrated edge. These appeared in a wide variation of moulds during this period, which still exist today. It would not be until J. Leon Williams' definitive work in 1911, which established the basic square, tapering and ovoid forms, that any resemblance of uniformity among manufacturers would exist for tooth form. Another advance during this period was represented by a patent which Laurin took out on John Allen's continuous gum work in 1853. The porcelain gum work used a platinum bar to bond it to the denture base.

THE AGE OF VULCANITE

Dentists had long sought a denture base material that could be manipulated with ease and would resist contamination and deterioration in the mouth. Among the pioneers were Antoine Delabarre and Thomas W. Evans who individually attempted in 1848 to use gutta percha for the purpose. The predominant method of denture construction during the first half of the century had been the laborious swaging of a gold plate against a plaster model or dentures carved out of bone or ivory. The introduction of general anesthesia in 1844 by Horace Wells and the experimentation with injected cocaine in 1884 meant that extractions became more commonplace. Not only did the need for artificial teeth increase but a more affordable and easily worked denture base material was required.

A major breakthrough for prosthetics came when Charles Goodyear
discovered the soft vulcanization of rubber and subsequently patented it in 1844. However, it was to be his brother, Nelson Goodyear, who would convert the soft flexible material to the hard ebonite substance. This product was known as Vulcanite. The original patent was registered on May 6, 1851 and after a subsequent reapplication, a new patent was received on May 18, 1858. These patents covered the process of manufacturing the hard rubber and the resulting product. The Goodyear brothers were hard pressed, however, in their fight against patent infringers. In 1862 the Goodyear company brought legal action against the New York Gutta-Percha and India Rubber Company. In ruling for the plaintiff the judge praised Nelson Goodyear by saying, "... a remarkable material of great value and well adapted for a great variety of uses. It is free from any disagreeable odor, impermeable to ordinary fluids, hard like ebony or ivory, susceptible of polish and with an elasticity similar in kind to that of tempered steel. For many purposes of utility and ornament its value is proved by its extensive use in the community."

In 1855 C.S. Putnam was approached by Messrs. Goodyear in order to apply Vulcanite to denture construction. Initial trials involved a plaster investment technique using powdered soapstone and the material was vulcanized for 12 hours. With the invention of a flask in 1856, the vulcanization period was reduced to 6 hours. Putnam then proceeded to give a dissertation on a portable vulcanizer to the Odontological Society in London in 1859. As a result, Claudius Ash & Sons became pioneer manufacturers of these vulcanizers, enabling widespread use of this material.

However, it was to be a Boston dentist, John A. Cummings, who in the United States patented the Vulcanite denture in 1864. This heralded an era of controversy and greed. Josiah Bacon, treasurer of the Goodyear company was instrumental in helping Cummings secure his patent after attempts to register it on three previous occasions failed. Thus began a period of extortion whereby all dentists had to buy a license ranging from 35 to 50 dollars per annum, plus a fixed amount for each rubber denture according to the number of teeth replaced. Many patents suits resulted between dentists and the Goodyear Company as a result of this penurious levy. The dental fraternity formed itself into the American Dental Protective Society to contest payment of the license. The indignation finally culminated in the murder of Josiah Bacon at the hands of a dentist, Samuel P. Chalfant, in April 1879.

**IVORY AND METAL DENTURES**

Although de Chemant had described the advantages of porcelain at the end of the 18th century, established practices using dentures carved out of hippopotamus and walrus ivory continued well into this era. Swaged gold bases were also used as an alternative to ivory prior to the introduction of Vulcanite. Purmann in the 17th century and Pfaff in 1756 has reported on the use of positive models made in wax and plaster respectively. Pfaff used a wax impression to produce his models and the concept of making a hard and accurate model from an impression was thus established to improve the precision of the fit of a denture base.

By the time Delabarre's handbook was published in 1820 there was included within it the idea of making a negative impression in foundry stone of a positive plaster model of a mouth and pouring a cast of lead or similar low fusing metal, which was then used as a die for striking a gold plate. More certain evidence that the swaging of gold was common by the late 1840's
was derived from the workshop book of Sir John Tomes. The register recorded details of dentures that were supplied to patients from the 17th of January 1848 till the 21st of December 1874. These included the weight of the gold, the number and type of teeth or bone blocks, the type of clasp and the name of the technician. The technique of swaging gold appeared to be a very closely guarded secret of each individual practitioner, thus explaining the lack of records relating to this technique and its introduction.

With the development of dental education and organizations in Britain during 1850 and in America in 1840, more widespread publication of the swaging technique began to emerge. The swaging of gold plates persisted until the 1940's as the technique was part of the final licensing examination at that time in Britain. This technique was eventually superseded by the lost wax casting process.

There were also attempts to use other materials for denture bases. A survey of English patents of the 19th century offers an invaluable insight to the innovations. Tomes, in 1847, described the copying of a denture in hippopotamus or walrus ivory using a device he called a "dentificator". Harrington in 1849 wrote of a press for forming denture bases out of tortoiseshell. Interestingly, mother-of-pearl was used as a material in Rubinstein's patent of 1855. Aluminum and tin were also tried as denture base materials in both case and swaged forms. The lack of subsequent records only meant that these materials fell into disrepute. Meanwhile more accurate impression methods were needed to ensure the proper fit of those bases which were produced.

**IMPRESSION MATERIALS**

During the nineteenth century the use of impression materials began to be related to the knowledge of the oral tissues, their behaviour and their reaction to manipulation.

Matthaus Gottfried Purmann was credited in 1711 with taking the first wax impression but it is probably more correct to assume that he made freehand models of the jaws in wax and fitted his dentures to them. It was Philip Pfaff, court dentist to Frederick II, in *Abhandlung von den Zähnen des menschlichen Körpers und deren Krankheiten* (1756) who suggested the use of a Plaster of Paris model made from an impression of sealing wax. The wax was softened in hot water before use.

The person or persons who developed Plaster of Paris as an impression material seems to be in dispute. It appeared for this purpose in 1844 and remained the most commonly used impression material throughout this era. In 1857 Charles Stent produced a thermoplastic composition which further improved the technique of impression taking. Gutta percha was mentioned as an impression material by C.F. Delabarre in 1848 during the construction of an obturator.

Concepts of atmospheric pressure in relation to denture retention were apparently attributed to James Gardette of Philadelphia in 1800. Writing in 1845, Chapin Harris stressed extension of the denture bearing tissues for stability. The technique of using plaster for impression-taking was eventually superseded by other materials such as gutta percha, beeswax and modelling composition. Plaster then came into use for a secondary impression. Impression trays were introduced about 1820 for ease of clinical technique, durability, rigidity and lightness. The materials included Britannia metal,
an alloy of aluminum, lead, copper and tin), German silver and pewter. The impression trays had rounded or squared troughs and high or short flanges. Some trays had double flanges, one for retracting the cheek and tongue to prevent them from distorting the impression. Non-metal trays during this era were made of gutta percha or Vulcanite. The technique of impression taking appeared to have been refined during the 19th century with more attention being paid to tissue morphology and function. This allowed for the construction of more elaborate prostheses such as partial dentures and obturators.

THE DEVELOPMENT OF PARTIAL DENTURE DESIGN

The earliest reported attempt at a partial denture restoration appears to be by Heister in 1711. The advent of the use of impression materials ensured that more elaborate restorations of the partially dentate mouth could be carried out and Fauchard recorded the first use of major connectors in 1728. He used a lingual and a labial connector to maintain rigidity of a lower partial denture. There was no evidence of the use of a palatal bar connector until that mentioned by Balkwill in 1880 and refined definitively by Southwell in 1903. De la Barre (1820) reported the first use of "little spurs" or occlusal rests for augmenting the support of a palatal obturator. Clasps or 'crotchets', ligatures of silk or springs were used as retaining agents. M. Desirabode first drew attention to the questions of partial denture stability, axis of rotation, the path of insertion and to clasping configuration in relation to the undercuts of a tooth and proceeded to diagram them. De la Fons was the first practitioner to report the use of a latter-day Jackson crib for the retention of a partial denture. He called this the 'double saddle spring.'

OBTURATORS

Pre-19th century developments of these appliances were confined to the areas of the hard palate. Nineteenth century developments were particularly in the field of soft palate prosthesis. By the early part of this century designs for palatal prostheses for acquired palatal defects had stagnated. Pierre Fauchard in Le Chirugien Dentiste in 1740 had published many obturator designs that were to be copied by subsequent practitioners of the 19th century. He recorded sponge retained obturators, an appliance with one fixed wing, one with two movable wings and an appliance with a denture combined. The prostheses were made of bone and metal.

J.B. Gariot in Traite des maladies de la bouche added to the previous list. He described appliances fixed to teeth after du Bois-Foucou's design; obturators with a spring, as mentioned by Cullerier; mechanical obturators with two wings movable in a vertical plane and an artificial soft palate that was made by Codan, a jeweller. The latter was a combined obturator and soft palate with the latter section playing a minor role.

C.F. Delabarre in 1820 went even further adding the class of juxtaposed obturators with ligatures. He gave credit to Bourdet for an invention which gained retention from the palatal defect. Delabarre's concept was to add the use of ligatures. The juxtaposed obturator with "elastic springs" was the next modification. This obturator was "a chapeaux" after Louis la Forgue's original design in 1802. The elastic springs were equivalent to present day clasps, in relation to retention. Delabarre soldered a rest or spur to each clasp. The spur engaged the tooth and prevented the clasp from sinking beneath the
gingival margin (Fig. 1). The other modification involved an appliance with a platinum bar carrying porcelain teeth. The soft palate and uvula were made of "gomme elastique" (rubber). The appliance was then maintained in position by springs attached to a frame around the lower teeth. J.C. F. Maury in 1828 made an original contribution to the final class of combined denture and obturator. This was a metal base with clasps to two remaining molars and carrying mineral teeth attached by pivots.

The juxtaposed obturators were gradually established and became the most widely used designs of the period. They were reported by Le Foulon and by Desirabode in 1843.15

SOFT PALATE PROSTHESSES

Before the hinged or flap velum was introduced for the treatment of congenital defects, obturators covered not only the defects of the hard palate but also those of the soft palate. Such appliances were recorded by Jourdain (1778), Cullerier (1804), Delabarre (1820) and Schange (1840).

Norman William Kingsley's *Obturators ancient and modern* (1877) did much to set trends in definitive soft palate prosthesis. He differentiated between simple palatal obturators and those more properly termed an artificial velum. Kingsley's classification for open ended soft palatal defects was associated with theories of muscular activity in relation to obturator function, especially those involving the artificial velum and bulb obturator.

However, other functional problems had to be contended with. In 1863, Gustav Passavant, a Frankfurt surgeon furnished important details about the physiology of the closure of the pharynx in speech. Pierre-Apollonie Preterre (1862), Friedrich W. Suersen (1867) and Otto Schiltsky (1881) showed similar appreciation of muscular function in relation to the soft palatal prosthesis. E. Sercombe (1857), G.H. Williams (1864) and G. Parkinson (1865) were
English dentists of the period who described the more conservative methods of treatment. They shared the common prescription of a swaged gold plate combined with a rubber sheet to seal off the soft palatal defect (Fig. 2).

Fig. 2. Sercombe’s flap velum obturator.

Charles W. Stearns made a name for himself by constructing his own artificial velum. He should, however, be credited as the first practitioner to stress supportive speech therapy with prosthetic rehabilitation. Improvement in speech in these patients was aided by a meatus obturator, an appliance which extended into the opening of the internal auditory meatus to reduce the nasal resonance by controlling the volume of air passing through the posterior nares. Such an appliance was described by S.P. Hullihen (1850) and G. Simon (1864). This concept of obturation was later refined by Froeschels and Schalit (1928) in Vienna (Fig. 3).

Fig. 3. Hullihen’s prosthesis. The domes to occlude the posterior nares are mounted on a slide which allows them to be positioned to fit the individual.

By the end of the 19th century obturator design was defined within established texts of the period. It has been reported that designs of the 19th century have persisted up to the present day and remain applicable to suitable cases.\textsuperscript{15}

**ARTICULATORS**

Philip Pfaff, in 1786, recorded the use of opposing plaster casts for the location of teeth on a denture. There was no recorded use of a mechanical instrument for the setting up of teeth until the 19th century. Credit for the
The invention of the first articulator appears to belong to J.B. Gariot. Gariot's plane line articular was constructed in 1805. This was a simple hinge instrument. Gariot assumed that opening and closing was all the movement that was desirable or necessary to reproduce in an articulator. There was no relation to the condylar hinge axis.

In America, James Cameron of Philadelphia on April 30, 1840 patented his "new and improved instrument for adjusting artificial teeth, so as to ascertain when their grinding surfaces fit." The Cameron articulator provided means for horizontal and vertical adjustments of both the upper and lower arms of the articulator. This instrument was really designed for a centric occlusion record, despite the available horizontal adjustment (fig. 4).

Daniel T. Evans obtained a patent for his articulator on August 28, 1840. It copied the principles of the Gariot articulator and added the improvement of a facility for protrusive, retrusive and lateral movements of the mandible. W.G.A. Bonwill the pioneer of anatomical three point occlusion, produced an articulator in 1858. This instrument was no more sophisticated than Evans' articulator but its design and construction was considered more practical. The Bonwill articulator was associated with the equilateral triangle theory. It was said by E.P. Hall that the only mandible that was ever found to be equilateral was the one measured by Bonwill!

The next improvement was developed by R.S. Hayes in 1889. This articulator added the feature of registering downward movement of the condyle. William E. Walker (1896) brought a revolutionary change in the development of articulators with regard to the interpretation of mandibular movements. Walker was the first investigator to draw attention to the fact that the centres of lateral movement of the mandible varied. His articulator was also the first to reproduce the varying angle of downward movement of the mandible. Walker designated this the "condyle path." The instrument was also able to reproduce eccentric movements, forward and backwards, when changing the occlusal position.
The first use of a facebow was credited to the American G.B. Snow during the late 19th century. This instrument related the maxillary rim to the hinge axis but did not have a reference to the orbital plane. However, Snow referred to R.S. Hayes as the inventor of an ‘articulating calliper’ and to G.K. Bagby for initiating its use. In 1894 George K. Bagby obtained a patent showing an articulator of ordinary construction, “... having attached to its joint pin a removable arm by which a measurement could be taken from a condyle of the mandible to the mesial line of the trial plates. This measurement can be transferred to the articulator.” This was a more simple device than Hayes' but it did not seem to have been very effective in relation to accuracy of the record taking.16

REFERENCES
3. Ibid.

DR. YAP was a student at Guy’s Hospital, London when in 1985 he won the Undergraduate Essay Prize awarded by the British Society for the Study of Prosthetic Dentistry with the paper published here. His address is 51 Britten Close, Golders Green, London NW11 7HQ, England. Requests for reprints should be made directly to the author.
Dr. Peter Pronych of Halifax, Nova Scotia, spoke on the flamboyant "Painless" Parker.

Dr. Donald L. Corbett of Montrose, California, whose topic was the dental health of ancient American populations.

From left to right: front row, Professor and Mrs. Gardner Foley; back row, immediate past-president Ben Z. Swanson and Errol L. Reese, Dean, Baltimore College of Dental Surgery.
President of the Academy, Arden G. Christen (left) greets A.D.A. President Abraham Kobren who addressed the meeting.

The late Dr. Jack Carr of Indianapolis who spoke on the career of Howard W. Raper, pioneer dental radiologist.

Outgoing president of the Academy, Ben Z. Swanson, Jr. (left) turning over the chair to the new president, Arden G. Christen.
Early in the history of the newly independent United States there arose a distrust of the allopathic physician and a loss of confidence in the medical systems that he followed. The therapies commonly employed often hastened the demise of the patient rather than cured him. Benjamin Rush was often the object of such accusations. This abuse became so intense that Rush filed a libel suit against a particularly vitriolic writer of the time who published under the pseudonym of 'Peter Porcupine'. As a consequence of this distrust and the isolation of most of the population in rural areas there emerged the 'grass-roots' herb doctor who sold his home-made remedies, usually cooked up in his or her own kitchen. These botanic doctors were often virtually illiterate, with strong prejudices against 'book-larnin'. Some were formerly preachers, and all of them preached against the harsh remedies used by the educated doctors. They often entertained religious beliefs that, like Christ, they were divinely chosen to heal. Possessors of this God-given gift, they felt that the state had no right to deny them the right to freely practice their healing art.

Samuel Thomson (1769-1843) was the most popular and influential of these botanic doctors. His movement laid the groundwork for the acceptance and popularity of Homeopathic Medicine later in the century. Thomson began his study of herbs when just a young farm boy. He tasted, and observed the effect of, ingesting the native herbs. He was eager to learn and observed the local herb women when they gathered field plants. He also incorporated into his system of healing the tried and tested folk remedies then prevalent in his area. Reference to his earliest writings appear in Austin’s Early American Imprints. In 1825 appeared his New Guide to Health, and Narrative of the Life and Medical Discoveries of the Author. These were issued separately at first and then appeared bound together in an 1835 edition.

The Thomsonian System and the Thomsonian Societies which were organized soon became very popular and had many adherents. The Botanic and Reform movements petered out by mid-century.

These botanic physicians picked up their bag of herbal remedies from pioneer herb doctors, Indians, farmers, “grannies”, woodsmen, Almanacs, and other sources of folk remedies. Some were itinerants and sold bottles of their medicines wherever they traveled. This tradition lived on into the early twentieth century in the traveling medicine show. It is safe to conjecture that before 1840, more of our American ancestors treated their own dental ills than ever saw a dentist.

Ague in the face, tooth-ache, sore lips and canker sores are some of the terms used in referring to the more common dental ailments by these early herb doctors in their books. I will quote from three authors: Elias Smith, William Steward and Samuel Thomson.

Elias Smith's book is entitled: The American Physician and Family Assistant, (Third edition, Boston 1832). My copy is a leather bound book measur-
Ague in the face. This is a very distressing complaint, though not generally dangerous. In the first stages of the ague, but little need to be done to effect a cure. When the person feels his face stiff, and some pain-ed, hold the "vegetable elixir" in the mouth, and bathe the face where the pain and swelling is with the same; which will generally remove the cold in a short time.

If this does not cure, take a dose of the powders; then take a tea-spoonful of cayenne pepper, and put it in a fine cloth, tie it up wet in "elixir", and put in the mouth, between the gum and the cheek; set by the fire, with a blanket over the head, and wrapped around the body. Set a bowl or some vessel on the hearth or floor before the fire, and let the water run out of the mouth, until the cold is out, when the pain will cease.

If the pain and swelling is in both sides, put the "cayenne" in a small cloth on both sides, which will cure, unless the disorder is very stubborn.

If all this does not cure, give an emetic, the same as for any other disease, which I never knew to fail in effecting a cure."

Smith then goes on to relate a case history from his practice. On page 178 he lists: "TOOTH-ACHE":

In common cases, hold the elixir in the mouth to take out the cold. If the cold in the jaw is the cause of the pain, treat it as the ague in the face. If this does not cure, pull them out."

The next book to be quoted is the first edition of Steward's Healing Art by Dr. William Steward, D. D., Sacco, Maine, 1827. My copy is a much-used and well worn leather-bound book that measures four and a half inches by seven inches. The first part of the book numbers 126 pages, followed by "A Concise Herbal" of 40 pages, and an appendix of 20 pages containing directions from the preparation of medicines. On page 39 is the following: "OF THE TOOTH-ACHE":

If the cause of the Tooth-Ache was rightly understood and Steward's remedy well known, there never would be so much cold iron employed in pulling them out.

CAUSES AND METHOD OF CURE

When the nervous Tooth-Ache is brought on by a cold or a seated ague in the head, sweat the head with hops and vinegar, as hot as you can bear; give the hot powdered physick, and blister the top of the arms; this will take out the ague and save the teeth, as the soundest teeth there are in the head, will ache the worst. If an ulcer is the cause, pull out the tooth; if the marrow at the end of the nerve is naked, and the orifice be large enough, put in the chrystalized white vitriol, or vitriolated zinck, covering the tooth at the same time, with lint, and lay upon the lint a compress of cloth, to absorb the glands of the mouth; particles of the crude corrosive sublimate will kill the same way, but it is more severe. This is better than the cold iron, after which teeth will stand and do good service for many years.

The last book I will quote here is New Guide to Health; or, Botanic Family Physician, Second Edition, by Samuel Thomson, Boston, 1825. My copy has 134 pages and has a quaint engraved frontispiece portrait of the author. It is one quarter leather bound and measures four by seven inches. On page 110 is:

Ague in the face. This is caused by cold in the glands of the mouth, which keeps back the saliva till it causes swelling and soreness; the canker becomes prevalent at the same time, which causes swelling and severe
pain in the face and throat. The sooner a cure is attempted the better; to effect this, take a dose of the tea No. 3, with a teaspoonful of No. 6 in it, for the canker; then tie a small quantity of No. 2 in a fine piece of cloth, wet with No. 6, and put it between the teeth and cheek, on the side where the pain is; set by the fire covered by a blanket, and breathe the warm air from the fire: this will prick the glands and cause the saliva to flow freely, which will take out the soreness and relieve the pain. The face may be bathed at the same time with No. 6. If the case is of long standing, so that the system is affected, and this does not remove the complaint, give a dose of No. 1. If it is caused by decayed teeth, fill the hollow with cotton wool, wet with oil of summersavory, or spirits of turpentine, which will deaden the nerve and stop its aching. This is good in all cases of Teeth-ache, and will generally effect a cure without extracting.

The language and similarity of therapies in Smith and Thomson are no accident or coincidence, but seems to indicate that Smith got his material from Thomson. Some of the numbered preparations and the nerve powder mentioned by Thomson are:

- No. 1, Emetic Herb, Lobelia Infata of Linaes.
- No. 2, Cayenne, or Capsicum.
- No. 3, Bayberry, root of White Pond Lilly, Hemlock and Marsh Rosemary.
- No. 6, Gum Myrrh.
- Nerve Powder is American Valerian, or Ladies Slipper; sometimes called Umbil, or Male and Female Nervine.

As if to reaffirm the old adage that history repeats itself, there has been a resurgence of criticism of, and loss of confidence in, the established healing professions of late. As a result of this distrust, some segments of our population have taken a renewed interest in “herbal” and “natural” healing, in Homeopathic medicine and other alternative healing methods. This turn of events, coupled with the plague of malpractice suits, should be a signal to the conventional healing establishment, a signal not to be ignored.

DR. GESHWIND has been a longtime collector of antique medical and dental books. He is retired from the private practice of dentistry. His address is 184-14 Midland Parkway, Jamaica, NY 11432. Requests for reprints should be made directly to the author.

For two months the case baffled the nation: Patients of a dentist in Bavaria were being subjected to insults and obscenities by a voice coming through the plumbing. An expensive and thorough investigation was conducted, and the plumbing was entirely replaced. The voice continued and the source remained a mystery.

Then one day, someone noticed a 17-year-old dental assistant named Claudia practicing her ventriloquism in front of a mirror. A phonetics expert concluded that the mysterious voice and Claudia’s voice were one and the same. Claudia was convicted of verbal assault and issuing threats, and she was sentenced to make 10 monthly payments to the Humane Society. (The Humane Society? How’d they get into this?)
What Is It?

—Alex Peck, Antique Scientifica
Post Office Box 710
Charleston, IL 61920

The intriguing item for this issue is something that would generally be found in the office of most every dentist as well as physician up until the early years of this century.

It is a hand-blown glass tube, 3½ inches long. The tube has a wide mouth at one end and tapers to a much smaller mouth at the other end. The item pictured is French and dates from about the mid-19th century. We know what this item was used for, but we’re anxious to see how many of you dental historians out there are aware of its function.

Unfortunately, we didn’t get any responses in reference to our last item. It had an ivory handle and when the ratchet was turned the sharpened beaks closed until they touched. Our guess is that this instrument was used to snap off teeth at the gingiva so that dowel crowns, such as the Richmond crown, could be constructed. The sharpened beaks were obviously made for cutting and it would have had to have been some hard structure such as a tooth that was the item cut. It was found amidst a number of old dental in-
instruments and was almost surely for dental use. But if any of our readers can come up with a more positive answer we'd be happy to hear it.

The Masticator which was the “What Is It?” poser two issues ago (April 1986) has continued to generate comment. A most interesting letter was received from Dr. Diego D. Bagur, President of the Committee on History, Museum of Odontology of the Argentine Dental Association. He writes:

We have at the Museum of the Asociacion Odontologica Argentina, in Buenos Aires, a device that corresponds exactly with the one published on page 57 of the Bulletin for April, 1986. This is the story of how we came into possession of this apparatus.

About fifteen years ago a lady who was an antiquarian was busy purchasing old furniture and art pieces from traditional “estancias” (ranches) in the Pampas. In one of her travels she met an old woman who was the cook in an “estancia” and who showed her the device whose picture we enclose. According to the cook’s story, she recalls having heard her grandmother comment that this device was over a hundred years old and belonged to the owner of the ranch at that time.

He had brought it from Europe. He was edentulous and his ill-fitting false teeth did not allow him to chew properly. Therefore he used the device as follows: upon sitting down at the table to eat he would remove his “esthetic” dentures; then he crushed the food with the appliance and swallowed the extra-orally chewed food. After eating, the servants would clean the thing and return it to the rancher who kept it in the soft leather carrying bag.

Fascinated with this finding, the antiquarian bought this piece and sent it to her dentist as a present, who eventually donated it to the Museum. We believe this chewing device is of German origin since it is engraved SANITAS-GESETZLICH GESCHUTZ and ETWUSTHOF-SOLINGEN. We believe it dates back to about 1860.

Cordially,
Diego B. Bagur

Another interesting communication regarding it was received from Dr. Bernard S. Moskow (the author of the delightful feature “Dentistry in Folk Art” which appears in each issue of the Bulletin). His letter is as follows:

Head-on view of the working end of the masticator showing how the tines intermesh in order to crush the food placed between the beaks.

Masticator, dating from about 1860, now in the collection of the Museum of the Argentine Dental Association.
The "masticateur" which you described in Vol. 34, No. 1 of the Bulletin is an implement that has been used for generations in France and Germany and apparently continues to be commonly employed.

While I suspect that under rare circumstances an edentulous adult might use it, it is almost always used to macerate meats and other fibrous foods for infants prior to the eruption of the complete deciduous dentition. My wife, who was born and raised in France, always prepared my son's food with a "masticateur" when he was a baby, and she informs me that they are "de rigeur" in France. The instrument which we purchased in Europe about 12 years ago is identical with the one seen in your published photograph.

Yours sincerely,
Clinical Professor
Department of Periodontics
Columbia University

The October 1985 issue had as its feature a wooden spiral which, as a later issue explained, was used to open the jaws in cases of trismus. We recently received this very interesting letter from Dr. Harold L. Hamburg of Brooklyn, NY, who specializes in treating patients under general anesthesia. He casts a new light on the use of the spiral screw, in addition to the one cited:

I assume the question concerning the screw was rhetorical. Unfortunately, I was only recently made aware of your Academy and your magazine. I would like to answer the "What Is It?" although I am certain that it has probably been answered by now.

I do not know its name but I certainly remember its use. Before dentists became aware of balanced anesthesia with its potentiating drugs and pluralistic channels of administration, the sole general anesthetic was nitrous oxide.

In order for nitrous oxide to render a patient unconscious, the dentist restricted the patient's oxygen: we really didn't anesthetize the patient in those days . . . we "anoxic-tized" him! 100% nitrous oxide was administered until the patient was unconscious. The mouth was kept in a closed position to prevent any leakage, as air leakage would change the mixture.

The muscles of mastication of a truly anesthetized patient are relaxed. There is a freeway space and it is easy to open the mouth in order to place a mouth prop. The muscles of an anoxic patient are in tetany. The contracted muscles offer no freeway space; it is impossible to open the mouth without a device. Your picture shows such a device.

It was placed between the first and second molars and turned clockwise. The threads engaged the teeth, the cone shape causing the jaws to be pried apart. When an adequate opening was achieved, a wedge was placed on the opposite side. The screw was usually made of wood so as not to injure the teeth, but this was not always the case.

Fortunately, with the introduction of trichloroethylene, halothane, penthrane, anoxia was contra-indicated and thus the screw device became obsolete.

Sincerely,
Harold L. Hamburg, B.S., M.S., D.D.S.
S:te APOLLINE V.M.
Fregit ad numerum dentes
meos Thren XV 9
Il ma rompu les dents, sans
m'en laisser une seule.
DENTISTRY AND FOLK ART XXIV: SAINT APOLLONIA

Jacques Callot (1592-1635)—French.

Engraving of Saint Apollonia from a book of images of saints and saints of the year, adapted from the Roman “martyrologue.” Saint Apollonia's day is recorded as February 9th.

Caption: He broke all of my teeth, without leaving even one.

Apollonia, the patron saint of dentistry, was canonized in Rome in 300 A.D. She was the daughter of a Roman magistrate in Alexandria, Egypt. Because she was a Christian who would not renounce her faith, she was tortured and her teeth were brutally extracted, after which she was burned at the stake. This occurred in the year 249 A.D. Although she is truly the patroness of persons suffering from toothache, she has also been adopted by the dental profession as its patron saint.

Callot, an inventive and prolific printmaker, produced more than 2000 drawings and 1400 prints in his short lifetime of 43 years. He studied engraving in Rome at age 15 and passed his early years in Florence where he was struck by the richness of everyday Florentine life—the beggars, the cripples and the comedians whom he graphically depicted in his etchings. He ultimately returned to his birthplace, Nancy, France, and to the ravages of the wars of religion that seesawed back and forth across the Lorraine. His famous series of etchings The Miseries of War accurately portrayed the random destructiveness of the wars, including lootings, hangings and beheadings.

NOTES & QUERIES

A FURTHER NOTE ON THE DENTAL ASPECTS
OF THE COMPOSITIONES OF SCRIBONIUS LARGUS

— Jeffrey S. Hamilton, Ph.D.
Norfolk, Virginia

In an earlier number of this journal, (Vol. 26, 1978) Lynn R. Thomas, D.D.S. examined the dental aspects of that fascinating 1st century Roman pharmacological text, the Compositiones of Scribonius Largus. As Dr. Thomas correctly pointed out in his article, Scribonius organized his book of prescriptions in the standard Roman arrangement of de capite a calcem, that is, in descending order from head to toe. It is not surprising, therefore, that Thomas limited his attention to chapters LIII-LXI, all nine of which deal specifically with dental care and treatment, and which fall naturally into place in Scribonius' discussion of various head pains. His discussion of the text is basically sound and informative, and his translation is in general quite accurate. In preparing an English translation of the full work, however, I have come across another chapter in which Scribonius offers advice on dental care. Located in a section concerned with coughs and fevers, chapter XCV points out circumstances in which a certain anti-febrile compound is efficaciously employed to treat dental problems as well as fever. Like so many other of Scribonius' compounds, this potion seems to be effective for an incredible range of maladies; but then, with ingredients such as opium, it would at least temporarily have relieved a variety of pains. The advice given is in accord with that provided in the earlier dental section, and as such it reinforces rather than challenges the general picture presented by Dr. Thomas. The following translation, then, is offered as a supplement to the earlier work, not as a corrective.

XCV. Another medicament for a dry cough: 28 gm. of live cress seeds, 28 gm. of henbane seeds, 28 gm. of opium, 28 gm. of myrrh, 14 gr. of saffron, 14 grn. of sulphur, and 84 gm. of white pepper. The medicament, drawn together with honey, is given at night (in a pill) the size of an Egyptian bean with 126 c.c. of water. Moreover, this medicament works for pains of the side and for swelling of the stomach, catarrh, disease in the bowels, and for those people who immediately vomit all things: and it is useful placed on top of and around a toothache and, if (the tooth) has been eaten away, placed inside the cavity. Beyond this it relieves the onset of febrile chills, at such time as the periodic return of these chills has been determined, administered one hour previously, the body having been rubbed for some time with warm oil. And it is useful for those people who are vexed by the periodic return of fevers without chills; on account of which this compound is called “anti-febrile.”

REFERENCES
2. Literally, the Latin phrase means “from head to heel.”
3. One specific instance where I do disagree with Dr. Thomas, however, is in Chapter LVII, where Scribonius makes reference to teeth loosened by a cold, not through chewing.
4. My translation to Scribonius’ introduction, a discussion of the place of drugs

5. This translation is based on the most recent, and now standard, edition of Scribonius' text, Scribonii Largi Compositiones, ed. Sergio Sconocchia, Leipzig, Teubner, 1983.

6. The Latin term lexipyretos, borrowed from the Greek, is given as an adjective meaning "that allays fever, anti-febrile," in the standard Latin Dictionary by Charlton T. Lewis and Charles Short, Oxford, 1879, but is clearly being used as a proper noun by Scribonius Largus in this passage. "Anti-febrile," then, is the name of this compound.

DR. HAMILTON is assistant professor of history, Old Dominion University, Norfolk, Virginia.

HELP SOUGHT IN TRACKING DOWN HISTORICAL BOOK

Dr. Max Geshwind, author of the fine feature "Antique Book Collector's Corner" which appears in each issue of the Bulletin, is seeking help in finding a dental historical work. He writes:

For several years I have been trying to verify a citation in Hedvig Lidforss Stromgren's Index of Dental and Adjacent Topics in Medical and Surgical Works Before 1800.

The citation is "Gradibus, Matheusde: De anatomia dentium . . . Papial, 1497. [Bibliotheque du Museum d'Histoire Naturelle, Paris.] ** The double asterisks signify unverified title according to the "Explanation" page preceding the listings.

I wrote to the Bibliotheque du Museum d'Histoire Naturelle in Paris and was gratified by a prompt response from M. Yves Laissus, Chief Conservateur. Unfortunately, that library does not possess a copy of this work.

Can any reader of the Bulletin shed any light on this citation in Stromgren?

Max Geshwind, D.D.S.
184-14 Midland Parkway
Jamaica, New York 11432

"AMERICAN DENTISTRY" IN PARIS A CENTURY AGO

One hundred years ago a statue was dedicated in Paris, France to the memory of Horace Wells, discover of anesthesia. In October, 1986, a reception was held at the residence of the Ambassador of the United States on the centenary of the dedication of that statue. On that occasion a facsimile edition of the first issue of the international New York Herald newspaper was distributed to the guests as being indicative of what Paris was like a century ago. Of interest is an advertisement for the services of a group of so-called "American" dentists. Exaggerated claims were obviously nothing out of the ordinary. It is understandable how William Hunter, M.D. came to excoriate what he also referred to as "American" dentistry. The ad, from the issue of Oct. 4, 1887, follows:

NEW AMERICAN DENTISTRY AND THE LOUVRE DENTAIRE

A model institution, unique in Europe, containing a numerous suite of the most perfectly fitted offices, where the best skill, the most delicate treatment, and the privacy of refined practice may be secured.

The worst decayed and loose teeth and roots are healed and tightened rapidly through the highly efficacious and painless "Heroic Antiseptic" treatment. Partial and full enamel crowns are then hermetically fixed without the slightest trace of artifice detectable either in front or at the back, and become equal to the best natural teeth, and the recurrence of disease is impossible. This beautiful process, which is quite novel, and only practiced in this establishment, avoids extractions, the painful process of trephining, the unsightly appearance of gold bars, bands and collars which ulcerate the gums and loosen the teeth and roots completely. This process dispenses likewise with the wear of artificial plates and wires and the old system of pivot teeth.

All operations are performed without the least pain through the application of the only genuinely inoffensive local anesthetic water, sole property of this establishment.

Notice — The American and English public are requested not to be led astray in Paris by a similitude of usurped names or by American Wonders." A visit to the Louvre Dentaire will be more edifying than blind credulity to the shameful divulgation of names and professional secrecy and advertising pamphlet puffs, which are mere adulterated copies. This establishment will continue advertising with the object of abolishing quackery. (Sic!)

It is interesting that none of the dentists mentioned belonged, to my knowledge, to the American Dental Club of Paris which was founded three years later (1890) by Thomas Evans.

— Jacques Fouré, D.D.S.
Neuilly, France

HOW A MUNCHED APPLE GAVE A ROBBER AWAY:
AN INCIDENT IN THE HISTORY OF FORENSIC DENTISTRY

— Oskar Sykora, D.D.S.
Halifax, Nova Scotia, Canada

Sheet Harbour is a small, picturesque, Atlantic coast community located on the beautiful, if somewhat forlorn, eastern shore of Nova Scotia. In this fishing village, on November 14, 1924, a break-in and robbery took place. A large quantity of merchandise was stolen from a clothing store owned by two local men, Roy Henley and William Chisholm. A certain man, William Steele, was eventually charged with the deed. In Magistrate's Court, County of Halifax, he was charged that:

"on or about the 14th day of November, A.D. 1924, did unlawfully break and enter the shop of one Roy Henley and William Chisholm there situate, and a quantity of men's clothing, shirts, handerchiefs and other goods of the value of two hundred dollars or thereabouts then being found therein did unlawfully steal . . . ."

Summonses were issued to two local, prominent Halifax dentists, Dr. J. Stanley Bagnall and Dr. A.W. Faulkner, to act as expert witness in this case. They were asked to identify the impressions of tooth marks in an apple core left in the burglarized store in Sheet Harbour and compare them with the occlusion and dentition of the accused. The dentists were successful in cor-
relating the tooth marks and their expert evidence helped to convict the accused.

The Provincial Treasurer of Nova Scotia remunerated each dentist with the payment of $25, "... in payment of January 5, 1926, Attorney General's Department, making plaster impression of an apple core et al. ..." Apparently no mention was made of remuneration for the two dentists' professional services! Yet this is considered to be the first known legal case in Atlantic Canada in which a conviction was obtained based on dental findings.

The moral of this little episode? Do not burglarize! If you must, do not eat apples; else destroy the evidence in the apple core or have your "bite" altered afterwards!

DR. SYKORA is a member of the Faculty of Dentistry, Dalhousie University, Halifax, Nova Scotia.

SOME HISTORY OF DENTISTRY IN WESTERN AUSTRALIA

Western Australia has had some outstanding dentists and recently has honoured two pioneer men who commenced their careers in the state and then went on to achieve wide recognition. Dr. Harold Mattingly had studied in the first intake of students in the Australian College of Dentistry, then situated in Melbourne, Victoria. Dr. Leonard Nathan began his career in dentistry in a small wheat-belt town of Katanning as an apprentice. Once he had completed his apprenticeship he went to Boston, graduating with distinction from the Harvard Dental School, in 1917.

Dr. Mattingly practiced in the gold field towns of Coolgardie and Ravensthorpe, during which time he accumulated a great deal of information about the Aboriginal people he had seen and treated. When he returned to Melbourne he wrote a thesis based on his Aboriginal studies which earned for him a Doctorate of Dental Science from the University of Melbourne. This work is still regarded as a landmark because it was the first serious scientific study of the subject in Western Australia, if not in the whole of the continent.

Dr. Nathan became Professor of Oral Pathology in Harvard University, and earned a world-wide reputation. He is also warmly remembered by many young Australian and New Zealand dentists for his generous help in undertaking postgraduate studies. In the University of Western Australia Dental School, there is a memorial prize in Oral Pathology which commemorates his achievements and generosity to the younger students who came to study under him.

In August 1985 a permanent exhibit was set up within Perth Dental Hospital, to commemorate these two men. It was helped very considerably by Mr. Keith Mattingly, Managing Director of West Australian Newspapers and also by nieces and nephew of Dr. Nathan who still reside in Western Australia.

The collection of archival material began on a systematic basis some years ago when Professor K.J. Sutherland who was Dean of the Faculty at that time, arranged to share the responsibility between the University, the Australian Dental Association and the West Australian Museum. There is a permanent exhibition of old equipment and other memorabilia in the Old Gaol Building which is part of the premises of the West Australian Museum in North Perth.
As well it has been possible to assemble, records of all kinds have been collected in the Battye Library here in Perth, which is part of the State Reference Library and the official repository of archival material. Quite a lot of material has been summarized on typescript which should make the preparation of an official history possible at some future date. Preservation of useful material has been the primary objective so far.

The story of dentistry in Western Australia is of great interest because of the vast distances between settlements. Recently Mr. Keith Mattingly published a book Dentist on a Camel which illustrates very clearly how pioneer dentists worked under these conditions. It is hoped that the book may arouse interest among historians in the United States. Former President Herbert Hoover was an engineer very much involved in gold mining and there is a very nice charcoal portrait of him hanging in the Council Chambers in Kalgoorlie.

Australia celebrates its bi-centenary in 1988 and there were hopes that an official history of health care might be written in time for that event. Towards this end an Association has been formed which comprises all major hospitals, public and privately operated, professional associations representing physicians, nurses, dentists and many other ancillary workers. A building known as Harvey House, which is closely associated with the King Edward Memorial Hospital, has recently been renovated to become the headquarters of the new association. It was officially opened late in 1986.

The dental profession will be well represented in the Harvey House exhibition, thanks very largely due to the West Australian Museum and the generosity of many older dentists who have donated practically all the material displayed. There is a genuine interest in the history of dentistry in this part of the world. It was very much influenced in the early days by well known American schools and by the Royal College of Surgeons in England and Edinburgh.

It may well be that some histories of various aspects of health care will be ready by 1988, but it is more likely that much of it will be ready when Australia celebrates its first 100 years of federation in 2001.

Dr. R.F. Stockwell
Unit 4, 89 Davies Road
Claremont 6010
Western Australia

50th ANNIVERSARY OF THE WELLCOME INSTITUTE

The Wellcome Institute for the History of Medicine in London, England, owes its origins to the collecting activities of Sir Henry Wellcome, founder of the international pharmaceutical company, Burroughs and Wellcome Co. At his death in 1936, the library and museum he had established were turned over to the Wellcome Trust which he had established to fund both biomedical research and research into the history of medicine.

The Wellcome Institute is today one of the world's largest centers for the study of the history of medicine. It has a staff of fifty and its collections of books, manuscripts, periodicals, paintings, prints and photographs total more than three-quarters of a million items. Research and teaching units are maintained at the universities of Cambridge, Glasgow and Oxford, while every year dozens of individual scholars benefit not only from a study of the material in the Institute's collections, but from grants and scholarships.
On September 1, 1986 the Institute opened a beautiful exhibition entitled “A Vision of History” commemorating 50 years of the Wellcome Trust. In it are featured a display of books, paintings and artifacts from the collections, many of which have not been exhibited before and all of them of great interest to the scholar in the history of the healing arts. The exhibit, which will run until April 10, 1987, is housed at the Wellcome Institute for the History of Medicine, 183 Euston Road, London NW1.
To the Editor:

Just a brief note of gratitude for the splendid manner in which you presented the paper on John Ross Callahan in the Bulletin of the History of Dentistry (October 1986). Dr. Maynard Hine, who had arranged for its publication, was especially pleased and I was also very pleased to see the end result of my labors. Many thanks for sending me the issue and for the concise editorial treatment of the article.

Sincerely,
Harvey Janke, D.D.S.
Sarasota, Florida

To the Editor:

I am a dental history enthusiast and would like to become a member of the American Academy of the History of Dentistry. Could you please send me the necessary information and materials to do so? You should also be very proud of your book Dentistry—An Illustrated History!

Sincerely,
Jeffrey L. Goodis, D.M.D.
Columbia, Pennsylvania

To the Editor:

I want to draw your attention to an error in the otherwise fine pen portrait of Professor Otto Walkhoff (Bulletin of the History of Dentistry, October, 1986). I did not study or work with Dr. Walkhoff. This error is compounded because it is stated in the caption of an illustration which gives even more prominence to the statement. I merely visited Prof. Walkhoff in 1928 while I was a graduate student at the University of Rostock, Germany. Armed with letters of introduction from my predecessor, friend and mentor, Dr. Hermann Prinz, I visited half a dozen prominent dentists in Germany. Prof. Walkhoff was retired at that time and was living in Lichterfelde, a suburb of Berlin.

Sincerely,
Louis I. Grossman, D.D.S.
Philadelphia, Pennsylvania
To the Editor:

As a toothbrush designer and manufacturer I am interested in developing a dialogue with your readers who are interested in toothbrushes and toothbrush history. I am especially interested in locating and cataloging collections that may exist. As far as I know, there is only one serious collection in this country at present.

Thank you for your help in this endeavor.

Sincerely,
James O'Halloran, President
RADIUS
9 West 19th Street
New York, NY 10011

To the Editor:

In a recent issue of the Bulletin of the History of Dentistry (Vol. 34, No. 2, October, 1986), there appears a letter from Dr. Efraim Ardila Garcia of Bucaramanga, Colombia (page 142) requesting information about G.V. Black for the possibility of a celebration of his 150th birthday.

It may be too late to help Dr. Garcia, but I wondered if he gained the information he needed, and, if not, if you would provide me with his complete address so that I may send him what information I have. I have been researching the life of G.V. Black for about three years and have access to some information not easily found. For this reason, I have recently chaired the local G.V. Black 150th Birthday Celebration and have also delivered talks to area groups on the subject.

Thank you for your help.

Sincerely,
Susan Weller, D.M.D.
Jacksonville, Illinois

To the Editor:

The September, 1986 issue of the Newsletter of the American Academy of the History of Dentistry mentions a book on dental history in Greek—Golden Jubilee. Can you tell me where I can get a copy? I am the “pre-dental advisor” at our local college and our college president is of Greek extraction and this would make a nice gift for him. Thanks for your help.

Dr. Joseph Serio
West Hempstead, New York

To the Editor:

I have written several books. One of them titled Dentosomatics concerns the inter-relationships of physical disorders with specific tooth contact and mandibular condyle position: a practical cause-and-effect interface of medicine and dentistry.

I would like to bring this to the attention of your readers, so would you please send me a copy of your advertising rates? Also, what is your policy concerning book reviews?

Cordially,
James E. White, D.O.
Mesa, Arizona

To the Editor:

I really enjoy the Bulletin. It continues to get a little larger and a little better all the time. The most recent issue (October, 1986) with the articles presented at the last annual meeting was excellent!

Most sincerely,
J. Henry Clarke, D.M.D., Director
Division of Behavioral Sciences
School of Dentistry
The Oregon Health Sciences University
Portland, Oregon
Once in a great while an historian comes along who captures the essence and spirit of an era in such a way that the reader can wholly sense the drama and excitement of the period. And when the historian is a dental historian we have a bonus!

Such an historian is Clifton O. Dummett who, in conjunction with his wife, Lois, wrote this wonderful book. It is the story of a period in the life of organized dentistry when the most profound changes were taking place within that portion of the profession; a period the authors characterize as “dentistry's shining epoch”; a time when changes were made that set the pattern for the nature of dentistry as we know it today. These changes were, for the most part, initiated by, and presided over by, a remarkable individual whose name became almost synonymous with organized dentistry: Harold Hillenbrand.

The American College of Dentists, one of the most prestigious dental organizations, has long had as a goal the furtherance of dentistry’s highest ideals of service and learning. History and journalism have been among the primary interests of the College since its inception in 1920. Its attention to history was formalized in 1939 when its Standing Committee on History was organized in order to collect and disseminate historical data. This book is published under the aegis of that committee.

To write the saga of the period in dentistry from 1930 to 1970, and one of its most illustrious servants, the committee chose Dr. Clifton O. Dummett, associate dean of the School of Dentistry of the University of Southern California and a past-president of the American Academy of the History of Dentistry. Dr. Dummett brought to his task not only his beautiful writing...
skills (as evident in the recently published biography of the 'Father of the Oral Hygiene Movement', Charles Edwin Bentley) but also a skilled historian's ability not only to bring out what is important in the period under study but to infuse that period with life and warmth.

Harold Hillenbrand received his D.D.S. degree in 1930 from the Chicago College of Dental Surgery (now the Loyola University School of Dentistry) and was immediately appointed as instructor of operative dentistry at his Alma Mater. Coincident with that he entered into private practice with his father, Dr. George Hillenbrand. But his organizational abilities and writing skills soon became evident and he was appointed editor of the Chicago Dental Society Bulletin followed in short order by his being made editor of the Illinois Dental Journal. It was these activities that brought Hillenbrand to the attention of the leadership of the American Dental Association and in 1942 he attained the prestigious position of editor of the Journal of the American Dental Association.

But his service was to be of much greater and more far-reaching importance for in 1946 he was elevated to the post of General Secretary of the A.D.A., a position he was to hold for 23 critical years.

Hillenbrand as General Secretary (later titled Executive Secretary) launched a series of changes in the organization that enabled it to more fully serve its membership. He broadened the staff, instituted new councils and bureaus and in general raised the level of competency of the A.D.A. staff.

Starting in the difficult post-war period, Hillenbrand acted as a calming and modifying force in a situation that threatened to split the organization over an apparent attempt to introduce racial quotas into dental schools. He brought dentistry to the consciousness of the Washington bureaucracy that was responsible for the nation's health care; he helped to broaden the scope of the A.D.A.'s Council on Education and was successful in protecting dentistry's interests when Columbia University attempted to put its dental school in a position of subservience to the medical faculty; and he was almost wholly responsible for the decision to build the beautiful new headquarters building in Chicago, a move that was not only financially beneficial to the organization but also served to show off dentistry in its finest light to the world.

One of the most satisfying aspects of the book are the remarkable footnotes which the authors have grouped together at the end of the book instead of having them distract the reader as he goes through the text. Every individual mentioned in the text has an expository paragraph in this "Annotation" section at the end. Every major incident dealt with is further explained or elucidated in this section; every legislative act is discussed here and all of this makes for a wonderful dental history reference book where one can find facts and figures that would take a lot of digging to uncover elsewhere.

Sadly, Dr. Hillenbrand died six weeks before the publication of the book, at the age of 80. He would have been proud indeed to have seen this beautiful tribute, not only to him, but to the profession of dentistry and its most important organization, the American Dental Association.

Dr. and Mrs. Dummett have compiled a legacy that is not only interesting and easy to read, but one which every scholar of dental history who is interested in the important years of 1940 to 1980 will find indispensable.

—Reviewed by Malvin E. Ring, D.D.S.
Rochester, New York
Collecting is becoming more popular today than ever before, and one of the most popular is that of items related to dentistry. This book is one of the first devoted exclusively to dental collectibles and a detailed list of every item related to dentistry is included in catalog format.

Over 550 items used in and related to the dental office during the 19th and 20th centuries — equipment, instruments, furniture, books, stamps, postcards, figurines, paper materials, advertising methods and a current price list — are all presented. Illustrations of many items are shown and will bring back memories galore. Also listed are current dental libraries and museums in the United States. Commercial antique dealers are given good coverage.

With today’s stimulating increase in collecting stamps related to dentistry, as well as dental numismatics, this book is an absolute treasure. Rare as well as easy to find articles are all presented. The known dental collectors and their addresses are given for use by those interested in contacting people already in the collecting habit or just beginning. For those dental collecting “buffs”, this book is a must.

—Reviewed by Lloyd E. Church, D.D.S., Ph.D.
Associate Clinical Professor of Surgery
George Washington University Medical Center
Washington, D.C.


This book includes an account of the establishment and development of medical education for blacks in the South. A Medical Department was started in Central Tennessee College in October 1876, and because of the interest — and financial contributions — of Samuel Meharry and his brothers (over $30,000) the name was changed to the Meharry Medical Department in 1877.

The author vividly describes the deplorable living conditions of the free slaves in the South in the post-Civil War era, and the struggles of the pioneers who persisted in their efforts to start this medical school for blacks. Poverty, illness and distractions from study caused some of the October 1876 class of eleven to leave the college; only one student, Dr. James Monroe Jamison, received the M.D. degree in 1877. He was Meharry’s first graduate and the first black physician to be formally trained in the South. Dr. Jamison resided in Nashville and “in 1880 was elected the first president of the State Colored Medical Association formed by Meharry’s early graduates and including some of the score of black doctors then residing in Tennessee.”

Three more new physicians were graduated in 1878. At their commencement exercises, Dr. John Bass, one of the graduates, said:

The question is often asked: “Why do more colored people die in a given period than whites?” Simply because they more frequently violate the laws of health. Why are they more liable to violate these laws? Because they have been deprived of men of their race capable of teaching these laws and urging the necessity of observing them. I know that there is a class who say that we will gradually die out, but the Medical Depart-
ment of Central Tennessee College is engaged in preparing physicians who, in a few years, will prove that assertion to be false, by decreasing the mortality which now is so great among our people. . . .

Dr. John Braden, one of the leaders in the Central Tennessee College, delivered the commencement address. He said:

I congratulate you tonight, first, because you are recognized as men. You were born slaves, the recognized property of others. . . . Tonight you are on your own; no fetters bind your limbs, no human law manacles your intellect, no earthly master has the keeping of your conscience. . . . I hail you as men. You cannot go to Africa as a people and it is doubtful if that would be best. Your home is here, and you are no carpetbagger. Generations in the future will find your people here. Cultivate for these generations the friendliest relations with your professional brethren and others of the Anglo-Saxon race, and by your diligence in study, modesty in deportment, fidelity, and kindness to your patients, and your earnest efforts to promote the highest welfare of your people, demand the respect of the entire community.

The next sections of this book describe the developing of Meharry into one of the two comprehensive predominantly black colleges of medicine, dentistry and the health sciences in the United States. (The other is Howard University School of Medicine.) As Lloyd Elam, chancellor of Meharry Medical College, points out in the foreword to this book, "the history of Meharry is truly a history of the education of the black doctor during the period 1876 to 1976, since this institution educated over half of the practicing black doctors during this period." Primarily under Dr. Elam's leadership a "new Meharry" has emerged.

Accounts in this book of the dental education program in Meharry are limited but significant. The School of Dentistry was founded in 1886 under the guidance of Dr. William Henry Morgan. An acknowledged leader in dentistry in the South, he had been the first dean of Vanderbilt's dental school. The dental course was two years in length until 1893 when it became four years. Dr. John P. Bailey was placed in charge of the dental program and served until 1890. Dr. James B. Singleton was then appointed as dean until his retirement in 1921. He labored under a shortage of money, equipment and teachers.

The size of the dental classes dwindled during the depression, but after many struggles the dental department was labeled the Meharry Medical College College of Dentistry at the time Dr. Turner assumed the presidency of Meharry (1938). Problems with the dental college continued, however, and in August 1941 preparations were made to close it. A final desperate appeal was made to the W. K. Kellogg Foundation and fortunately funds for strengthening the school were granted. Dr. Don Clawson, a dentist of international stature, accepted an offer to be director of Dental Education beginning in 1942. Clawson, who was then president of Meharry, working with Dean Turpin, made many improvements in the Dental College, modernizing the curriculum and increasing the faculty. Due to the declining health of Dean Turpin, Dr. Clawson became more active, and when Dr. Turpin died in 1948, Dr. Clawson was in charge of the Dental School until the appointment of Dr. Clifton O. Dummett as dean in 1948. This competent administrator was succeeded by Dr. William H. Allen in 1949, a Meharry alumnus, then Dr. Logan and in 1976 Dr. Eugenia Mobley became Meharry's Dean. Full accreditation by the A.D.A. was restored, and in 1976 ground was broken for a new building. The future of Meharry's College of Dentistry was assured.
Educating Black Doctors includes vivid descriptions of the health problems of the blacks in the South; of the need for care of the black indigent and the struggles of Meharry to help solve these problems. Anyone interested in the health affairs of blacks from the post-Civil War era up until 1976 will find this book most interesting and deserving of a careful reading. For the dental historian the book would be valuable for its discussions of problems complicating health care for blacks, the struggles of the leaders of Meharry’s College of Medicine and only incidentally of dentistry and nursing.

—Reviewed by Maynard K. Hine, D.D.S.
Chancellor Emeritus, Indiana University
Indianapolis, Indiana


It would be difficult indeed to imagine dentistry being practiced without the assistance of a competent dental hygienist. Yet this important member of the health team didn’t come into the picture until very recently. So recently, in fact, that it wasn’t until 1952 that all states licensed hygienists. And Europe lagged behind the United States in this, with a curriculum for the training of hygienists not being introduced into England until 1949!

From a modest beginning by the dentist Alfred C. Fones who, in 1914, trained a group of women in his carriage house next to his house to become purveyors of instruction as well as treatment in preventive dentistry through careful prophylaxis, this important health care field has grown to the point that in little over seventy years there are about 40,000 hygienists in this country alone.

The fascinating story of the origin and development of the dental hygiene movement is mirrored in the growth of the American Dental Hygienists’ Association. This group, founded in 1923 by 46 forward-thinking hygienists, has matured into a major component of the dental health network. Consequently, a history of the ADHA is, in effect, a history of the dental hygiene movement.

This formidable task was undertaken by Wilma Motley who was a president of the Association from 1966 to 1968 but who is more widely known as the outstanding editor for 12 years of the fine Journal of the hygienists association. Mrs. Motley brings to the task a wide knowledge of her group’s history, having first entered into the field of dental hygiene upon graduating from the University of Southern California in 1933. In addition to working as a hygienist, she taught at her Alma Mater on a part-time basis and during that time developed a deep interest in her profession’s history. She began collecting all kinds of material relating to her field and most of the numerous illustrations that enrich her book are from her own collections. She also brings to the task good writing skills; she is the author of the widely acclaimed and reprinted textbook Ethics, Jurisprudence and History for the Dental Hygienist.

The book’s first chapter “The Origins of the Oral Hygiene Movement” is a fascinating one, tracing the history from 1898 when a prominent dentist, Dr. M. L. Rhein, trained his “dental nurse” to clean his patient’s teeth. The trials facing the fledgling profession are next recounted, culminating in the founding of the Association in 1923. From that point on, the author uses the reports and minutes of the annual meetings of the organization on which
to build her history. It is a most comprehensive method and allows for complete coverage of all aspects of the problems facing the profession: racial discrimination; preceptorial training vs. formal education; commissioning in the armed forces; admittance of men into the profession (at first all state dental hygiene laws allowed for the licensure of women only) and many other subjects.

The book is benefited by an extensive series of appendices such as a chronological listing of all important happenings in dental hygiene from 1893 to 1979; a chart of the growth of dental hygiene internationally; the evolution of the structure of the ADHA; and a listing of all officers of the Association from its inception to 1982.

Mrs. Motley, who has been a long-time active member of the American Academy of the History of Dentistry, is to be congratulated for putting together this excellent accounting of the history of a most important adjunctive branch of the dental profession.

—Reviewed by Malvin E. Ring, D.D.S.
Rochester, New York


In 1846, Dr. William Morton demonstrated that ether vapor could prevent the pain of surgery. Using this date as a nidus, Martin Pernick examines the aftermath of this discovery as well as other discoveries before and after this date. In early America, prior to 1846, the practice of any profession was a rough, harsh and grim undertaking. Very few students escaped the switch with any regularity. Most educators could apply it with plenty of muscle... and it hurt. Judges, after sentencing, watched the prisoners as they were hanged, dunked, branded or given the prescribed number of lashes to see if their verdicts had the desired effect. Doctors bled, blistered and purged. If the patient still lived and was still sick, then the preacher was called. He, in turn, asked the patient to pray and repent for his evil deeds so he could get well. Dentists and surgeons, who operated on screaming, struggling patients, preferred that the patients behave in a heroic manner and accept pain as a badge of manhood or womanhood. Many patients tried, but died of shock.

Morton's ether won acceptance more rapidly than any previous discovery or innovation. Within weeks, it was used in England and France. The pros and cons of this discovery caused repercussions that prevail, even to this day. In fact, there was no general rush to operate under anesthesia; many surgeons refused to use it at all, and hospitals were slow in accepting anesthesia. Many doctors used it in their office without any training or precaution whatever. Pernick presents a wealth of fascinating detail about every aspect of the birth and infancy of anesthesia. The doctors' beliefs regarding the relationship of individual sensitivity to pain and age, sex, race, class and ethnic background are given in detail.

The use of anesthesia brought about a dramatic increase in the number of surgical cases, most of which were necessary and not experimental. The author shows that industrialization — not anesthesia — caused the shocking rise in surgical deaths. The relationship between doctor and patient was altered, never to return, and women were now entering the medical field...
in greater numbers. This book is an absolute storehouse of information concerning anesthesia and pain, but from a different viewpoint than previously presented. The effect of Morton's discovery had a profound effect at all levels of society.

This book will be of great interest to everyone in the medical and dental professions, in the fields of ethics, social history, women's studies and history of medicine. Mr. Pernick is to be congratulated on his work. . . and work it was. Nearly half of the book is taken up with tables, notes, primary and secondary sources of bibliography. Here, in one volume, one finds an absolute treasure of information, most interesting and quite easy to read.

—Reviewed by Lloyd E. Church, D.D.S., Ph.D.
Assistant Clinical Professor of Surgery,
The George Washington University Medical Center,
Washington, D.C.


As the title suggests, the book deals primarily with medicine, although dentistry is mentioned throughout the text often enough to warrant our interest. The author has chosen to "portray the quack, not merely as a rogue, but a dedicated amateur with a mission, or a villain with a heart." In this endeavor, he succeeds admirably, and he takes the reader on "a journey through time traversed by the patient, the physician, and his shadow, the quack."

The book traces the origins of quackery and examines the different "cures" among the Chinese, the Egyptians and other ancient civilizations. It leads us through the European "Dark Ages" to the Renaissance, to the great age of quackery of the 18th century up to modern times. The reader, interested in painless oral surgery for his patients, could try the prescription advocated by John of Gaddesden, an orthodox Renaissance physician who told his patients to "let a green grog which leaps from tree to tree be seized and let the gut be taken. Any tooth squeezed with it will immediately fall out." The role of the "worm", which caused all of the dental problems for so many centuries is discussed at some length, and even Shakespeare is drawn into the controversy. The reader will learn that the art — rather than science — of tooth transplants flourished well in the 18th century England. Even Lady Hamilton "was almost reduced to selling her teeth"; fortunately for Hollywood, her dentition and history, she chose Lord Nelson as a safer haven for her financial security. It is precisely this attention to human detail, the personal glimpses from the past history of mankind, which make this book so delightful to read. An appended bibliography allows the reader to pursue the topic further in depth if so desired.

My regret is that the book does not have more illustrations; out of 19 illustrations, only one deals with a dental subject. And what ever happened to Painless Parker, the New Brunswicker who left Canada in 1896 at the age of 24 and moved to the United States to become the most colourful and controversial member of our profession? He surely deserves to be mentioned. Also, the typesetting error such as "agaony" instead of "agony", on page 128, could have been avoided with more careful proofreading. But those are small details, and they do not detract from the enjoyment of the book.
The author dedicated this work "to the Quack, the peddler of Hope". It is my hope that this book will be read and enjoyed not only by members of the health professions, but by everyone who is interested in mankind's age old fascination with health.

—Reviewed by Oskar Sykora, D.D.S., Ph.D. Dalhousie University
Halifax, Nova Scotia, Canada


This book consists of papers presented at a 1984 conference on fluorides in San Francisco. The emphasis of the conference and this resulting book are on the clinical uses of fluoride, particularly as they apply to the dental office.

The latest research findings are presented on the professional application of topical fluorides and the roles of prophylaxis and dental prophylaxis pastes in caries prevention. Other topics include stannous fluoride; fluoride supplements; dietary sources of fluoride; fluoride mouthrinses and fluorides in periodontal therapy. Also discussed are the impact of fluorides on root caries and root dentinal sensitivity. The ADA's Council on Dental Therapeutics laboratory methods of assessing fluoride products is presented as are the latest findings on fluorides and remineralization. New fluoride agents and their methods of delivery are introduced. A short chapter is presented on the clinical uses of fluoride for the special patient. Lastly, there is a chapter titled "Are All Fluoride Dentifrices the Same?" The answer is "no"; recommending any toothpaste accepted by the ADA no longer suffices. Those toothpastes using sodium fluoride in their formula are the most effective. Unfortunately, the text does not state which commercial toothpastes have sodium fluoride — a frustrating omission for the dental professional who may not have time to compare toothpastes on grocery shelves.

The book lists the current supplemental fluoride schedules which are dependent upon a child's age and weight and were established in 1979. Manufacturers have become sensitive to the concerns that babies may be getting too much fluoride from formulas and baby food. United States manufacturers have reportedly removed major amounts of fluoride from their processing techniques.

The sections devoted to root caries, root dentinal sensitivity and remineralization are of clinical interest as people live longer and the edentulous rate goes down. This is true, too, of fluorides in periodontal therapy. As cavity rates continue to decline, periodontal disease assumes more attention. Currently, stannous fluoride has been shown to be an effective addition to routine periodontal procedures.

In the 10 years since the last conference on fluorides, new products have been introduced to the dental profession such as fluoride rinses, which are discussed in detail. Available clinical evidence suggests that neutral sodium fluoride is the medium of choice.

Many of the findings presented will have, or already have had, an impact on the daily practice of dentistry. For instance, routine professional topical fluoride is no longer recommended for patients with low caries incidence but rather for child or adult with a high caries rate. Research also
shows that continued routine use of this prophylaxis step before a professional topical fluoride treatment is no longer necessary or recommended. This research will most certainly have broad public health consequences. Topical fluoride treatments have always been an expensive "one on one" procedure, not suitable for large groups because of cost and time. Now, school, migrant and other groups can have this treatment easily. However, this latest finding could have an adverse effect, economically, on private practice.

Clinical Uses of Fluoride is thorough and covers all areas of the subject well. There are extensive references and many excellent graphs, tables, drawings and photographs which help to clarify and organize the material. For professionals with a research background, the book presents the material on fluorides in a scientific manner. However, for other professionals the book may have a heavier scientific orientation than desired. The book is definitive and will result in changes in clinical practice. Those dental professionals who are in private practice, public health and academia will find this book a necessary and important addition to their libraries.

Reviewed by Cynthia Chappelka, RDH, Coordinator, Dental Auxiliary Training Program (Hazard Project) Community Dentistry College of Dentistry University of Kentucky


A series of lectures presented by the author, a professor of orthodontics at London University, to his students at the Institute of Dental Surgery at the Eastman Dental Hospital in London have been, with additions, incorporated into this short textbook intended for graduate students preparing for a degree or diploma in orthodontics.

The book provides a cursory review of growth and development of the face, jaws, and dentition; etiology of malocclusion; diagnosis; cephalometrics; treatment planning; the author's approach to treatment of the major Angle types of malocclusion; a short chapter on care of cleft palate patients; and surgical orthodontics.

The author's methods of treatment are presented by case reports, no doubt a reflection of the lecture genesis of the material. The narration is liberally sprinkled with personal opinions, some documented, some not. Illustrations are generous but are of moderate quality, particularly cephalometric radiographs that are too dark to show detail of soft tissue. Pages 48, 57, and 61 display photographs upside down, turned, and transposed.

The book is generally well organized and is quite readable. Each chapter contains a list of suggested readings including authors cited in the text; citations are not, however, footnoted.

Recommended treatment procedures reveal the author's strong utilization of removable appliances and generally ignores techniques currently taught at the university level in the United States. The author is unenthusiastic about functional appliances, devoting a page and a half to a discussion concluding "a wise rule in using these appliances is to set a time limit of six months, and if at the end of that time no discernible improvement has occurred then a more conventional form of treatment should be instituted."
Illustrations of casts of finished results in presented case reports do not show the detail and precision usually expected, perhaps as a result of the author's use of removable rather than banded/bonded appliances. There is no mention of gnathological concepts of occlusion in completed patients nor reference to temporo-mandibular joint consideration in orthodontic treatment.

An index is provided, but is not completely accurate. A page reference in the index for retention, Class II, Division 1 directs the reader to a page of illustrations of functional appliance types.

Generally the material is outdated with few references to recent publications. The book may be appropriate for its stated purpose, but would be of limited value to the clinician or graduate student in the United States and Canada.

—Reviewed by Larson R. Keso, D.D.S., M.S.
Private Practice of Orthodontics
Oklahoma City, Oklahoma


This is a unique book for which it is difficult to write a review; but, make no mistake, it is an excellent presentation. There is no author and no editor listed. The Preface is written by Dr. Robert J. Moes, with no mention of his title or position.

The title _Thirty Books_ is also somewhat misleading. Certainly, there are not just 30 books in such a library; but, at no place, does one find any discussion pertaining to why these 30 books were chosen or who did the choosing. There is a list of six contributors, headed by Elizabeth S. Crahan, Secretary of the library. There is no explanation of the relationship between these six people and the 30 books. The Preface traces the history of the library from 1885 to its present form, which today is considered to be one of the world's greatest collection of rare medical books and books on medical history.

One must assume that the contributors used some method to select the 30 books they considered to be the greatest contributions to medicine and medical history. If so, they scored a “bull's eye” 30 times. Starting with Hippocrates, the title page of Rabelais' Latin translation in Lyon in 1532 is presented, followed by a brief biography of him by Robert J. Moes, one of the contributors. A brief sketch of the original book is given. This describes the cover, type of paper, print and language used.

There follow 29 outstanding presentations of the greatest men in medical science who have influenced the medical field for all time. Who were they? To find out, you will be obliged to obtain your personal copy. You will not be disappointed. You will also be quite surprised to find one of the “men” to be a woman.

—Reviewed by Lloyd E. Church, D.D.S., Ph.D.
Associate Clinical Professor of Surgery
George Washington University Medical Center
Washington, D.C.
MORE SHOTS FROM THE ANNUAL MEETING

Some of the attendees at the 35th annual meeting of the American Academy of the History of Dentistry, Miami Beach, October 16, 1986.

Dr. Cesar A. Mena of Miami, former Dean of Havana's dental school, discussing the history of dentistry in Cuba.

Dr. Norman O. Harris of the University of Texas described the fight for fluoridation in his community.

The newly installed officers of the Academy (left to right): Dr. Malvin E. Ring, editor; Dr. Jack Gottschalk, president-elect; Dr. Arden G. Christen, president; Dr. Ben Z. Swanson, Jr., immediate past-president; Dr. H. Berton McCauley, secretary-treasurer. Missing were Dr. Joseph Salcetti, vice-president and Dr. Richard Glenner, historian.
This Publication is Available in MICROFORM

FOR INFORMATION WRITE:

University Microfilms International
Dept. F.A.
300 North Zeeb Road
Ann Arbor, MI 48106
U.S.A.

Dept. F.A.
18 Bedford Row
London, WC1R 4EJ
England
NOTICE TO CONTRIBUTORS

Contributions, which may deal with any aspect of dental history or bibliography, are invited. The maximum length for original articles is about 5000 words. Manuscripts should be typewritten with double spacing and wide margins. Only one copy need be submitted. Please consult former issues as to both literary style preferred as well as method of listing references. All references should be as complete as possible and contain the name(s) and initial(s) of the author(s) and the full title of the paper or book. Citations of periodical articles should include name of journal, year, volume number and complete pagination, in that order. For books cited, the city of publication, publisher, date and full pagination are to be given. All photographs which are intended to accompany articles must be black-and-white glossy prints no smaller than 3x5 inches. Photographs will be returned only if so requested.

Manuscripts, as well as all correspondence relating to advertising, the publication of papers, news-items and so forth should be addressed to the Editor, Bulletin of the History of Dentistry, 2 Roby Drive, Rochester, NY 14618.

SUBSCRIPTIONS AND OTHER BUSINESS MATTERS

Active and honorary members of the American Academy of the History of Dentistry receive the Bulletin as a consequence of their membership. The subscription price for all others, domestic and foreign, is $12.00 per year. Foreign subscriptions must be paid for in United States funds. All copies sent to foreign countries by surface mail only. No arrangements can be made for air-mail delivery.

All correspondence pertaining to subscriptions, rates, servicing of existing subscriptions should be addressed to the Circulation Director:

   Aletha Kowitz
   Bureau of Library Services
   American Dental Association
   211 East Chicago Avenue
   Chicago, IL 60611

The Bulletin is published semi-annually in April and October

ISSN: 0007-5132
The Officers of the
American Academy of the History of Dentistry

President
DR. ARDEN G. CHRISTEN
Indiana University
School of Dentistry
415 Lansing Street
Indianapolis, IN 46202

President-elect
DR. JACK W. GOTTSCHALK
8040 Reading Road
Cincinnati, OH 45237

Secretary-treasurer
DR. H. B. McCauley
3804 Hadley Square East
Baltimore, Maryland 21218

Vice-president
DR. JOSEPH SALCETTI
5207 Wisconsin Ave., N.W.
Washington, DC 20015

Editor
DR. MALVIN E. RING
2 Roby Drive
Rochester, New York 14618

Historian
DR. RICHARD A. GLENNER
3414 West Peterson Avenue
Chicago, Illinois 60659

The American Academy of the History of Dentistry, a not-for-profit organization founded in 1951, has as its goals the following:
Increasing interest among dentists in dental history.
Encouraging dental schools to develop historical collections on dentistry, and to offer adequate instruction in dental history.
Developing a broader understanding of the facts of dental history among the leaders in dentistry in order to aid them in their attempts in solving important problems in dental education and practice.
Stimulating more thorough and comprehensive research in dental history, thereby extending the boundaries of dental knowledge, giving substantial support to growing professional culture.
Creating an authoritative body to which important questions relating to dental history could be referred for factual verification.
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFLECTIONS ON A DENTAL CENTENNIAL: 100 YEARS OF MEHARRY’S DENTAL SCHOOL</td>
<td>81</td>
</tr>
<tr>
<td>—Clifton O. Dummett, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>THE STRUGGLE FOR FLUORIDATION: A PERSONAL AND HISTORICAL PERSPECTIVE</td>
<td>93</td>
</tr>
<tr>
<td>—Norman O. Harris, D.D.S., M.S.D.</td>
<td></td>
</tr>
<tr>
<td>THE STATUS OF DENTISTRY AT THE TIME OF FREDERICK THE GREAT, 1712-1786</td>
<td>101</td>
</tr>
<tr>
<td>—Rolf Will, Dr. med. dent.</td>
<td></td>
</tr>
<tr>
<td>THE TRUE DISCOVERER OF THE DENTAL AIR TURBINE HANDPIECE, SIR JOHN WALSH OF NEW ZEALAND</td>
<td>106</td>
</tr>
<tr>
<td>—Malvin E. Ring, D.D.S., M.L.S.</td>
<td></td>
</tr>
<tr>
<td>CLASSES IN DENTAL HISTORY: DENTISTRY IN THE WRITINGS OF ALBUCASIS DURING THE GOLDEN AGE OF ARABIAN MEDICINE</td>
<td>110</td>
</tr>
<tr>
<td>—Jerry J. Herschfeld, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>THE AMERICAN ACADEMY OF THE HISTORY OF DENTISTRY: RECOLLECTIONS OF A FOUNDER</td>
<td>115</td>
</tr>
<tr>
<td>—Gardner P. H. Foley, M.A.</td>
<td></td>
</tr>
<tr>
<td>A CASE OF PROSTHETIC DENTISTRY IN ANCIENT EGYPT</td>
<td>120</td>
</tr>
<tr>
<td>—Yoel Blustein, D.M.D.</td>
<td></td>
</tr>
<tr>
<td>Noah Stern, D.M.D., M.S.D.</td>
<td></td>
</tr>
<tr>
<td>Samuel S. Kottek, M.D.</td>
<td></td>
</tr>
<tr>
<td>ODDMENTS IN DENTAL HISTORY: A WARNING ABOUT UNSKILLED EXTRACTIONISTS IN 19TH CENTURY ENGLAND</td>
<td>125</td>
</tr>
<tr>
<td>—Malvin E. Ring, D.D.S., M.L.S.</td>
<td></td>
</tr>
<tr>
<td>THE ANTIQUE BOOK COLLECTOR’S CORNER CHOICEST “RECEIPTS” FROM THE “COMPLEAT SERVING MAID”</td>
<td>127</td>
</tr>
<tr>
<td>—Max Geshwind, D.D.S.</td>
<td></td>
</tr>
<tr>
<td>ON THE OCCASION OF THE 150TH ANNIVERSARY OF THE BIRTH OF G. V. BLACK</td>
<td>129</td>
</tr>
<tr>
<td>—Aletha Kowitz, M.A.</td>
<td></td>
</tr>
<tr>
<td>Hannelore T. Loevy, C.D., M.S., Ph.D.</td>
<td></td>
</tr>
<tr>
<td>WHAT IS IT?</td>
<td>137</td>
</tr>
<tr>
<td>—Alex Peck</td>
<td></td>
</tr>
<tr>
<td>DENTISTRY IN FOLK ART XXV: THE GOOD PARISIANS</td>
<td>138</td>
</tr>
<tr>
<td>Bernard S. Moskov, D.D.S., M.Sc.D.</td>
<td></td>
</tr>
<tr>
<td>NOTES AND QUERIES</td>
<td>140</td>
</tr>
<tr>
<td>Some further notes on the discovery of local anesthesia</td>
<td></td>
</tr>
<tr>
<td>More support for a stamp honoring Horace Wells</td>
<td></td>
</tr>
<tr>
<td>Response concerning citation of Matheus de Gradibus</td>
<td></td>
</tr>
<tr>
<td>The originator of the D-M-F index</td>
<td></td>
</tr>
<tr>
<td>A new museum is born</td>
<td></td>
</tr>
<tr>
<td>LETTERS TO THE EDITOR</td>
<td>145</td>
</tr>
<tr>
<td>BOOK REVIEWS</td>
<td>147</td>
</tr>
<tr>
<td>ROSTER OF ACADEMY MEMBERS</td>
<td>159</td>
</tr>
</tbody>
</table>
Mural commemorating the 5 Meharry brothers who, in 1876, established Meharry Medical College as the medical department of Central Tennessee College in order to give young Negroes an opportunity for specialized education.
Reflections on a Dental Centenniel: 
100 Years of Meharry’s Dental School

—Clifton O. Dummett, D.D.S.
Los Angeles, California

The occasion of the Centennial celebration of the School of Dentistry of Meharry Medical College in 1986 provided us with an opportune time to review events at a significant moment in its history. These occurrences characterized substantial progress made by the dental school in achieving the main objective of teaching students how to render high quality dental service to the American people. The College was begun to educate Afro-Americans in becoming providers of health services to a segment of the population victimized by racial discrimination. Through its schools of medicine, dentistry and nursing, the College accumulated a creditable record in its dedication to this effort.

Continuous advancements in the health sciences affected medical and dental education and forced professional institutions to update their curricula to keep pace with improved treatment modalities. Meharry’s School of Medicine was the first unit of the College to initiate major steps to adjust its programs. Designated to begin this task was the prominent and experienced physician Dr. Edward Lewis Turner (Fig. 1). Turner first came to Meharry in 1936 at the invitation of Dr. John J. Mullowney, Meharry’s second president. He was appointed professor and head of the Department of Medicine. His efficiency in reorganizing the department and in teaching internal medicine won the respect of students and facilitated his succession first to the deanship of the medical school, and then the presidency of Meharry in 1938.
President Turner immediately instituted plans to upgrade dentistry in a process similar to that he had used in revamping the School of Medicine. Dr. Donley Harold Turpin, a 1918 dental alumnus (Fig. 2), had been serving as dental clinic supervisor, an appointment made by President Mullowney in 1921. President Turner first changed the name from 'Dental Department' to 'School of Dentistry' and appointed Dr. Turpin Acting Dean in 1938.

Progress in dental education at Meharry was slow until 1942 when a special event occurred to further President Turner's plans for the dental school. Dr. Marion Don Clawson joined the Turner administration to head the dental school.

M. DON CLAWSON NEW HEAD OF THE DENTAL SCHOOL

Turner and Clawson had been professional colleagues in the late Thirties in Beirut, where they had served as Directors of Medical and Dental Education, respectively, at the American University of Beirut. Clawson joined Meharry as Director of Dental Education, a title selected by him with the approval of Dr. Turner.

Don Clawson was born in Clay City, Illinois, in 1900, the only son of Shaba (Bessy) and Ellis Henry Clawson. He obtained his early education in Clay City, and following graduation from Harter-Stanford Township High School, he enlisted as a hospital apprentice in the U.S. Navy in 1920. Discharged as a pharmacist's mate second class in 1922, he completed his predental requirements at St. Louis University and his dental education at Washington University School of Dentistry, class of 1926. From 1926-28, he practiced general dentistry in Bonne Terre, Missouri, and moved to St. Louis in 1928 where he practiced for a year before travelling to England.

Continuing his work outside of the United States, he spent 1930 to 1941 in the Middle East where he served as demonstrator and lecturer at the University of St. Joseph in Beirut; director of dental services at the Iraq Petroleum Company, Kirkuk, Iraq; professor of operative dentistry, hospital staff member, and director of dental education, all at the American University of Beirut. He was also a visiting clinician at Syrian University at Damascus.

Upon his return to the United States in 1942, he was approached by President Turner, and agreed to become involved with reorganizing Meharry's dental school as director of dental education. Clawson's background of education, experience, and professional contacts proved invaluable.

Following the appointment of Dr. Clawson in 1942, Dr. Turpin relinquished all administrative responsibilities as Acting Dean and continued as Professor of Prosthetic Dentistry and Dental Consultant of Hubbard Hospital.
A short time after establishing residence in Nashville in 1942, Dr. Clawson recruited Dr. Clifton O. Dummett who was completing graduate studies in periodontics at Northwestern University Dental School in Chicago. On July 1, 1942, Dummett joined the faculty to establish a department of periodontics and oral pathology, and initiate the teaching of endodontics at Meharry. At that time there were not many American dental schools with established endodontic departments.

Early in 1943, the Council on Dental Education of the American Dental Association visited Meharry as a part of its national accreditation program.

In 1944, Dr. Clawson was asked to organize and direct dental health services at the Oak Ridge Tennessee Reservation of the Manhattan Project for Atomic Research. Colonel Stafford Warren, director of the entire health program of the Manhattan Project, had decided to invite organized dentistry to become involved with the Oak Ridge dental health program. At a highly secret conference, Captain C. Raymond Wells, president of the American Dental Association and Dr. Oren A. Oliver, chairman of Procurement and Assignment of the Fourth Service Command, selected Dr. Clawson because of his wide experience and his knowledge of the strict security measures which governed every activity of the Manhattan Project. With the cooperation of President Turner of Meharry, Colonel Warren was able to arrange for Clawson's six months leave of absence for full time duty at the Oak Ridge Reservation.

DUMMETT BECOMES ACTING DEAN

President Turner then appointed Dr. Dummett Deputy Director of Dental Education with direct responsibilities to the President “for the general supervision of the activities of the dental school including supervision of clinic and classroom activities, curriculum management, student and staff problems.”

The school continued its five-year improvement program supported by funds Clawson obtained from the W.K. Kellogg Foundation, Battle Creek, Michigan.

As was the case with many other dental schools, Meharry encouraged inbreeding of dental faculty. Dummett had been the first Afro-American graduate of a dental school other than Meharry to join the dental faculty, and he was determined to use competence rather than school of graduation as a primary criterion for appointment at Meharry. The program called for the hiring of well-qualified teachers. This was to be accomplished by sending a few talented Meharry graduates to leading dental centers for postgraduate study, and inviting them to join the faculty upon completion of their studies. A few exceptional older faculty were detailed for short refresher courses. The resident salaried faculty were all black, and they were supplemented by visiting faculty, all leading white dentists from Nashville who volunteered their services. Their classes were audited by resident faculty, and both visiting and resident faculty cooperated in offering postgraduate courses to in- and out-of-state minority group students.

Toward the end of that year, President Turner announced his intention to resign from the presidency in order to return to medical teaching. On December 31, 1944, he closed out one of the most progressive administrations in the history of Meharry.
CLAWSON NAMED PRESIDENT OF MEDICAL SCHOOL,
A FIRST FOR A DENTIST

On January 1, 1945, the Board of Trustees elected M. Don Clawson the fourth president of Meharry Medical College. He was the first dentist to serve as Meharry's president, and it was the first time in the nation that a dentist had been named president of a medical school (Fig. 3).

One of President Clawson's first decisions was to appoint a top administrative officer for the School of Medicine. He created the position of 'Director of Medical Education' and appointed Dr. Murray C. Brown, a white physician, to the post. In the director of medical education was vested the responsibilities for external administration of the School of Medicine. Dr. Michael Bent retained the title of Dean and was responsible for internal administration of the medical school.

When Clawson became president he retained the title of Director of Dental Education, thereby ratifying the pattern of a two-tiered administrative level: white directors above black deans. He assigned the affairs of the School of Dentistry to Dr. Dummett who rejected the title of Dean and instead created the administrative title, Chairman, Dental Administrative Committee and Director of Clinics.

The initial years of the Clawson presidency were eminently successful. A compassionate, friendly and sensitive man, fluent in several languages, Clawson became well-known and thoroughly integrated in his presidential duties. He consulted frequently with those responsible for medical and nursing administration at the College (Fig. 4). He grappled with problems of the Alumni Association, worked closely with the pre-Alumni office.

Fig. 3. Dr. M. Don Clawson, the first dentist to be elected president of Meharry College.

Fig. 4. President Clawson (far left in first row) with faculty members and student members of the honorary society of the School of Medicine.
President Clawson (right) with Meharry's oldest living alumnus. Dr. John Wesley Anderson (MD-1885, DDS-1887) has contributed liberally to the College's financial growth and was also president of the Meharry Alumni Association.

THE DENTAL SCHOOL MAKES GREAT STRIDES

Meanwhile, in the School of Dentistry, comparable progress was being achieved. As president, Clawson supported all forward-looking programs Dummett initiated. Budgetary constraints prevented him from approving all new programs, but the dental school began to experience a taste of the support which the medical school had always enjoyed under the jurisdiction of medical presidents. The Council on Dental Education of the American Dental Association fully approved and accredited Meharry's School of Dentistry in March 1945. It represented a first-time achievement by a school for minority dental students, and was a fitting tribute to the reorganizational programs instituted just three years previously. In the list of the nation's accredited dental schools published in the April 1945 issue of The Journal of Dental Education, only 24 of the 38 schools were fully approved, while 12 received provisional approval.

Conditions at the College continued to prosper and, in the ensuing months, the dental school added a class in dental laboratory technology with eighteen students. This innovation made Meharry one of the first in the nation to inaugurate such a training program.

The Department of Dental Hygiene, discontinued in the early 1940's, reopened its two year diploma course with six female students.

A novel program was instituted to extend the services of the school's dental clinics to the surrounding community. Oral examinations of elementary school children were accomplished at their schools by junior and senior dental students. The examinations were used as a basis for bringing children to Meharry's pedodontics clinic for the correction of oral disorders.

One of the nation's first in-service educational programs for the dental faculty was inaugurated at Meharry. Designed to help dental teachers keep
abreast of the changing philosophies of education and the newer methods of instruction, the school contracted with neighboring Fisk University in developing a lecture series to revise instructional methods and procedures.

A dental research program was initiated with the first clinical studies on physiologic and pathologic pigmentations of the oral tissues. The February, 1945 issue of the *Journal of Dental Research* published the results of observations on oral pigmentations in the black population.

An outreach effort to inform and recruit young people for careers as dentists and dental auxiliaries was instituted. Two brochures directed especially to females were entitled “Dentistry as a Career for Women,” and “An Opportunity for You.” The latter emphasized the role and importance of the dental auxiliaries.

During the first year of Clawson’s presidency, numerous honors were accorded him by local and national dental and professional organizations. Among the most significant were his election to the presidency of the USA Section of the International College of Dentists; the award of the Pierre Fauchard Gold Medal; appointment to the Board of Trustees of Fisk University and Meharry Medical College. These acclamations reflected favorably upon dentistry and specifically on the School of Dentistry.

**AN O.K.U. CHAPTER—A BLOW TO SEGREGATION**

A significant accomplishment in breaching the walls of segregation was the establishment of a chapter of dentistry’s national scholastic honor society at Meharry. In June 1943 Dummett had written to his former teacher at Northwestern, Dr. George W. Teuscher, who was secretary-treasurer of Omicron Kappa Upsilon, requesting information about initiating a Meharry chapter of OKU. He had been impressed with the records of some excellent students at Meharry who deserved the opportunity to compete for that honor. Upon receipt of the requested information he promptly complied with the instructions. However one year later in June 1944, the Supreme Chapter notified him that the petition to establish a component chapter had been denied. Reasons for the denial were not revealed but were made known by another of his former teachers, Dr. Robert E. Blackwell, professor and chairman of operative dentistry at Northwestern (Fig. 6), who was serving as national president of Omicron Kappa Upsilon. In his main address to the annual meeting of OKU in March 1944, Dr. Blackwell said:

> So far as I know this is the first application for a charter by the faculty of a school for Negro dental students. Upon receipt of the application your secretary sent ballots to the subordinate chapters, as required by our by-laws. At the expira-

![Fig. 6. Dr. Robert E. Blackwell, national president of Omicron Kappa Upsilon, whose strong opposition to segregation ultimately led to an OKU chapter being established at Meharry.](image)
tion of 30 days, the constitutional limit, 14 affirmative votes to 4 negative had been received — an insufficient number of votes to decide the question.

The important point is not the number of ballots cast but rather the reasons for the negative votes. Letters accompanying the ballots indicated that some of the negative votes were cast because Meharry College is a school for colored students and because social complications would arise, which might be embarrassing in some quarters if a charter was granted.

It should not be necessary to remind you that gentlemanly conduct, scholarship, character, industry, ability, even genius, are not confined to the white race. We have no such monopoly. Suppose George Washington Carver had been a dentist! In some of our schools we have had colored students of the highest scholastic attainments and they have competed for honors and won them without question. I personally know of several colored men who wear the key of Omicron Kappa Upsilon with credit to themselves and to our Society. Why a school should be denied a charter for the single reason that its students are Negroes is beyond my comprehension. I think there is only one question to be considered in this case: Is the standing of Meharry College sufficiently high to justify a charter in that institution? In my judgment it is. Perhaps a few years ago it was not, but the same might be said of some other schools.

Finally, may I say that at this critical time in the world’s history when men are fighting to keep some semblance of democracy alive, we should use our influence, little though it may be, to preserve and to extend that democracy. By recognizing ability and achievement among men and among schools regardless of color or creed, we are doing something to further that objective.

Dr. Dummett formally protested the denial to the national secretary and at the latter’s suggestion submitted a second petition in November 1944, following the report by the Council on Dental Education listing Meharry’s School of Dentistry among those institutions fully approved.

In October 1945 favorable action was taken on the petition for membership and Meharry was awarded a chapter, Omicron Omicron. This marked the first occasion in which a school for Afro-American dental students had been awarded a chapter in dentistry’s national honor society, enhancing the stature of Meharry’s dental school among its peers.

DUMMETT BECOMES DEAN—THE NATION’S YOUNGEST

In July 1946, President Clawson approved an educational leave of absence for Dr. Dummett to accept a Julius Rosenwald Fellowship in Public Health at the University of Michigan. Incidentally, the Reckham Building in Detroit was the site of the 1947 annual meeting of the National Dental Association at which President and Mrs. Clawson were honored guests of the Association. Dummett resumed his duties at
Meharry in 1947 and was named Dean of the School of Dentistry, making him, at age 28, the youngest dental dean in the nation (Fig. 7).

He advanced Clawson's philosophies of dental education and encouraged the faculty to compose articles for publication, to become involved in research studies, to present lectures and clinics and to prepare themselves for the various specialties in dentistry. In order to strengthen the teaching programs at Meharry, he recruited graduates from other dental schools, supported productive efforts of department chairmen, and improved the administration of the school through strengthened committee appointments.

Traditionally, Meharry has always experienced difficulty in procuring sufficient funds to support its educational programs, and the bulk of what it acquired usually went to enhance programs in the medical and nursing schools. Because the dental budget was limited, it was impossible to institute significant expansions in the graduate and post graduate programs.

Rapid post-war developments resulted in a larger number of black students becoming interested in dentistry, and the dental facilities which were relatively unused when Clawson first came to Meharry were in full operation with competent students who had acceptable predental records.

During the 1947-48 school year two major situations occurred to affect administration relationships — one specifically in the dental school and the other with ramifications for the future of Meharry. Both, however, were the consequences of entrenched custom.

The titular designations of "Director of Dental Education" and "Dean" were inherently ambiguous in the perceived responsibilities vested in each, and created confusions in the school's internal and external relationships. At the end of his first year as dean, Dummett declined to continue with this dichotomy. President Clawson promptly relinquished the title of Director of Dental Education, and Dummett was named Dean and Director of Dental Education. This was the first and only appointment of a black to the Director post at Meharry, representing a gainful rupture in a confusing and cumbersome administrative system. Meharry's administrators had always been under financial restraints and President Clawson inherited the perennial problem of meeting fiscal needs. The urgency to find a lasting solution to the College's precarious financial position propelled Clawson into a situation that underscored the high cost of America's separate but equal practices.

MEHARRY TRAPPED INTO SUPPORT OF "SEPARATE BUT EQUAL"

Clawson recognized that support by philanthropic organizations such as Carnegie, Kellogg, and Rockefeller, would become increasingly limited requiring private educational institutions to seek other sources of revenue. Although he was not in sympathy with the philosophy of segregation, his approach to dealing with the problems facing his stewardship of Meharry was based on pragmatism: The code "separate but equal" was a southern luxury, and therefore the cost should be borne at the source — within state tax revenues. Several court decisions had concluded that it was the responsibility of the states to provide financial support for the education of all their citizens. These pronouncements stemming from legal skirmishes involving segregation in education gave impetus to Clawson's decision regarding the involvement of Meharry Medical College in the Southern Regional Plan proposed by the governors of southern states.

In October 1947 the Conference of Southern Governors in Asheville, N.C., agreed that one of its purposes was to provide adequate facilities for higher
education for both whites and Negroes either within the several states or without. This action was taken in order to provide a collective solution to the dilemma posed by court decisions.

Collective responsibility would make it possible for states to combine their resources according to availability while at the same time fulfilling the mandated responsibility for educational opportunities for blacks residing in their states, without dismantling "separate but equal." The first step toward achieving this goal was the formation of the Regional Council for Education composed of governors of the southern states and other representatives.

The Council established a Commission on Human Medicine, Dentistry, Pharmacy, and Nursing to provide the basis for making recommendations to the state legislatures concerning the possibilities of joint interstate support for facilities needed in these fields.

Clawson offered the College as the regional institution for training black health profession students. The proposal was resisted by a small number of the College's administrators. As a member of the Regional Council for Education's Commission on Human Medicine, Dr. Dummett consistently rejected segregated regional planning and was uncompromising in his efforts to prevent Meharry from participating in segregated regionalization. When Meharry's participation eventually became official, Dummett promptly resigned as Dean and Director of Dental Education effective June 30, 1949. In a widely heralded circular to Meharry alumni he documented the reasons for his action, but appealed to the alumni to support President Clawson in his efforts to do what was best for the College.

In succeeding months the national controversy on regionalization continued to rage. Reactions to the proposal were widely manifested as Meharry was caught up in the national discussions about the philosophy of regionalization, an emotional issue which produced strong supporters and opponents. Believing that he would be derelict in carrying out his duties as president if he did not allow Meharry to take advantage of the Regional Plan concept, Clawson was unprepared for the unfavorable national press coverage Meharry received. His motives stemmed not from a desire to maintain the racial status quo, but rather to protect and assure the future growth and well-being of an institution whose potential he never doubted.

CLAWSON LEAVES THE PRESIDENCY

Clawson came to believe that his continued association with Meharry had developed into a liability for the institution. In his 1950 annual report to the College's Board of Trustees, he said:

In accepting the presidency of Meharry in 1945, when its future was dark and uncertain, I felt that with hard work and the full cooperation of the trustees, faculty and staff we could not only save the establishment, but could expand it into one of the leading medical centers within a period of five years.

This five-year period ended January 1, and most of the objectives I envisioned have been realized. These have been trying and difficult times for Mrs. Clawson and myself, but they have been some of the most satisfying of our lives.

It has, however, taken me completely away from the dental profession, and I am expressing an ever-growing desire to return to my first love — dentistry.

I therefore request to be relieved of the administrative duties of the college effective June 30, with the suggestion that a committee be ap-
pointed to administer the affairs of the college until my successor can be chosen."

In June 1950 Clawson was granted a release from his presidential duties and given a one year sabbatical leave effective July 1, 1950 "with full salary and appreciation of the Board of Trustees for his services, first as director of dental education for 3 years, and second as president of Meharry Medical College for 5 years."

The trustees adopted Clawson's recommendation that Dr. Robert A. Lambert of the Rockefeller Foundation be named chairman of a committee to administer the College until the next president was chosen.

It was Clawson's plan for the future, the international situation permitting, to reopen the dental school in Beirut. It had ceased operations on account of World War II. His sudden death in Oak Ridge, Tenn., on December 17, 1951, at the early age of 51, ended these hopes.

The passage of time facilitates a balanced appreciation of the significant contributions Clawson made to Meharry in general, and specifically to the dental school which experienced its golden years from 1942 to 1949. In retrospect, it is apparent that efforts to upgrade the faculty, curricula, and students in order to meet national accreditation standards foretold the end of onerous vestiges of traditional paternalism. Out of the healthy, vigorous debate on the issue of regional education came the full realization of an emerging new climate among the American people inhospitable to the impoverished credo of separate but equal, thus paving the way toward integrated education. The eventual assumption by blacks of the leadership roles in the affairs of the College indicates the validity of the push for competence and excellence — hallmarks of the efforts and hopes of M. Don Clawson, D.D.S., fourth president of Meharry Medical College.

REFERENCES

7. Official letter of appointment of Clifton O. Dummett as Dean and Director of Dental Education, June 11, 1948.


35. The Meharian Yearbook, 1943, p. 22.

36. The Meharian Yearbook, 1945, p. 16.

37. The Meharian Yearbook, 1944, p. 16.


40. The Meharian Yearbook, 1945, p. 32.

41. The Meharian Yearbook, 1943, p. 22.
42. The Meharrian Yearbook, 1944, p. 17.
43. The Meharrian Yearbook, 1945, p. 34.
44. The Meharrian Yearbook, 1945, p. 54.

(This paper was presented at the 35th Annual Meeting of the American Academy of the History of Dentistry, October 17, 1986, Miami Beach, Florida.)

DR. DUMMETT, author of the acclaimed new book The Hillenbrand Era, is professor of dentistry and Chairman, Department of Community Dentistry, University of Southern California, Los Angeles, California. He is also a past-president of the American Academy of the History of Dentistry. His address is Post Office Box 77006, Los Angeles, CA 90007. Requests for reprints should be made directly to the author.
In spite of the fact that fluoridation of community water supplies has been proven to be a safe and effective way of reducing the caries rate in children by approximately 60 percent, irrational and emotionally charged counter-claims are frequently made by a small segment of the population which have effectively blocked its implementation in many areas. The recent defeats of attempts to fluoridate the water supply of a large Texas city are described here.

Probably the most complete and accurate account of the kaleidoscopic events marking the fluoridation and antifluoridation campaigns between 1940 and 1955 are detailed in Don McNeil's book, *The Fight for Fluoridation.* The book chronicles the successes and failures of many of the people who made an early commitment to water fluoridation, and strongly underlines the old caveat, "Those who do not learn from history are doomed to repeat it."

On January 25, 1945, with World War II still having eight months to run, the City of Grand Rapids, Michigan, became the first city in the world to supplement a deficient fluoride level of an existing water supply; Muskegon was selected as the control city. This was to be a long term study monitored by H. Trendley Dean of the United States Public Health Service, the Michigan Department of Health, and the University of Michigan Dental School. It was expected that ten or fifteen years would elapse before the critical questions about safety and effectiveness of water fluoridation would be known. In New York, Dr. David Ast of the Dental Division of the New York Department of Health was initiating a similar study, with the City of Newburgh to receive the fluoride supplement, and Kingston to act as the control. Neither Ast nor Dean were anxious for a major nationwide fluoridation effort until the critical safety questions were answered.

**WISCONSIN DENTISTS AHEAD OF THE NATION**

Contrary to the intentions of Ast and Dean, there were several dentists, especially in Wisconsin, who did not want to wait ten or fifteen years, thus sacrificing the teeth of one generation of children. Finke, a Sheboygan dentist, first suggested statewide fluoridation at the 1941 meeting of the Wisconsin State Dental Society. A dentist from Madison named Frisch entered the fray to become "the fullback of the Wisconsin fluoridation team." Another Wisconsin dentist, Dr. Hargrave, a former vice-president of the American Dental Association, with great professional prestige, became the moderating "quarterback" of the group. The fourth member, Dr. Frank Bull, State Dental Director, first advocated waiting out the two big fluoridation experiments at Newburgh and Grand Rapids before expanding the practice nationwide. This cautious attitude changed in 1943, with Bull becoming an indefatigable campaigner throughout Wisconsin, often sharing the rostrum with Frisch. The group's objective was to have 50 communities fluoridated by 1950. But this was still 1943, when the Wisconsin State Dental Society was taking a cautious and correct scientific approach to water fluoridation. A Fluorine Research Committee was formed with Hargrave as chairman, with subcommittees to study the engineering, economic, safety, effectiveness and legal problems.
In 1946, the Wisconsin group spearheaded a campaign that resulted in water fluoridation for Madison. Following this success, the period between 1948 and 1950 was one of great travail for the enthusiastic proponents of fluoridation. The major block to a more rapid expansion of their hopes was the fact that neither the U.S. Public Health Service nor the American Dental Association had yet endorsed water fluoridation. For this brief two year period, the Wisconsin proponents questioned whether the health organizations, or the fluorophobics were their worst enemy. In several towns and cities, fluoridation campaigns probably failed because of the cautious support given by reputable scientists. However, much earlier than expected, information began to accumulate that the results from both the Grand Rapids and Newburgh studies were significantly positive. As a result, in early 1950, the policy of the U.S. Public Health Service changed from a wait-and-see attitude to one of full scale endorsement. By November 1950 the House of Delegates of the ADA had also unanimously endorsed fluoridation, followed in 1951 by a similar endorsement by the House of Delegates of the American Medical Association. All was set for a full scale assault for water fluoridation.

THE FIRST REAL ANTI-FLUORIDATION STRUGGLE IN WISCONSIN

In Stephens Point, Wisconsin, population 15,000, a fluoride campaign was being waged in 1949. Frisch was there to explain, to cajole, and to bluntly ridicule if he believed it appropriate. Alexander Wallace, 67, was the opposition general. He was a self-styled “Inspector General” for all public decisions manifested by his prolific letter-writing to the local newspaper. It was he who fired the first salvo that was to characterize future antifluoridation activity when he asked Frisch at a public meeting, “Why are you advocating putting poison into our water?”

Two months later in July the Stephens Point council rejected fluoridation, but the local women took over, and by November the Council reversed its stand. At this point with victory seemingly assured, two other individuals entered the scene, Ben LeHaye, who was a repairman for the Soo Railroad and a Mr. Skalski, a business man who objected to any tax increases. The trio, Wallace, LeHaye and Skalski, then began a concentrated effort to gather names for a petition to rescind the ordinance. Rumors were started in Stephens Point that the dentists were against fluoridation. The word “poison” became the watchword of the antifluoridationists, and the skull and crossbones their logo. Businessmen could not allow profluoridation literature to be placed in their stores without threats of loss of business. So Stephens Point rejected water fluoridation. Some local women summed up the reasons for the defeat: “None of us had what it took to hold street corner sessions, none of us could start a fight to attract attention, and none of us could talk about poison.” (The eventual fluoridation of the Stephens Point water supply had to wait until 1970.)

Wallace, LeHaye and Skalski were now the antifluoridationists’ “experts” in medicine, dentistry, constitutional law and toxicology — areas in which they had little knowledge, and certainly no training. They exchanged information with other antifluoridationists in different parts of the nation. This was the beginning of a network of organized opposition to water fluoridation. New slogans were added to the antifluoridationists’ repertoire. Fluoridation was a “chemical rape” of the people. Fluoridation was the “cause of cancer.” The list of conditions allegedly caused by fluoride became so long that there was always a disease that anyone with an ailment could relate to.
McARTHYITES AND ANTI-COMMUNISTS ENTER THE FRAY

As the war years faded into the past, the threat of Communism was vaulted into national headlines by U.S. Senator Joseph McCarthy. Not to be outdone, the antifluoridationists developed the necessary scenarios to equate fluoride with a sinister Communist plot. There was the high school counselor from Hartford, Connecticut, who testified at a public hearing that “in the rear occiput of the left lobe of the brain is a small area responsible for the individual’s power to resist domination. . . . the scheme of mass control by water medication was seized upon by the Russian communists because it fit in with their plans to communize the world.” For good measure, the antifluoridationists informed the legislators that if any of them had been drinking fluoridated water for more than a year they would be mentally incapable of making the proper judgement about fluoridation.

A NATIONAL ANTI-FLUORIDATION NETWORK TAKES SHAPE

Over the years the networking that started at Stevens Point evolved and was perfected. The first organization to appear on the scene was the National Health Foundation, organized in Moravia, California, in 1964. It had, at various times, been antivaccination, antipasteurization, and antifluoridation. In 1974, a Dr. John Yiamouyiannis, who was a biochemist, joined the National Health Foundation to revitalize their programs. This resulted in a considerable increase in antifluoridation activity. Eventually he left the National Health Foundation, but a new array of antifluoridation organizations began to appear. First there was a National Health Action Committee (NHAC), then the Safe Water Foundation (SWF). These were then merged to form the Center for Health Action operating out of a private home in Springfield, Mass. In each event, there appears to be an involvement by Yiamouyiannis. For instance, prior to the merger, Yiamouyiannis was both president of SWF and executive director of NHAC. The NHAC operated out of Yiamouyiannis’ home in Ohio, while SWF was also headquartered at the same residence. In all cases the organization titles imply vibrant health, whereas if their objectives are attained, there will be pain, suffering and dental disfigurement for millions of children as well as adults. It is interesting to speculate how many millions of teeth have been lost because of the organized activities of the antifluoridationists.

The national antifluoridation operators can have a considerable impact on a local campaign. As soon as there is a hint of fluoridation activity, a “Pure Water”, “Save Our Water”, or similarly-named group appears on the scene to develop, coordinate and implement local antifluoridation policies. The larger national antifluoridationist organizations, which are apparently well funded, supply literature to the local groups, probably provide additional money for advertising or legal fees, act as consultants in court cases or in developing petitions for referenda. Occasionally they will send in an “expert” consultant to fan the antifluoridation flames with radio or newspaper interviews. In all cases the words “poison”, “cancer” and “allergy” constitute a fixed part of their vocabulary, despite their lack of expertise in these areas. In most cases, they act as verbal terrorists who hold the oral health of the people hostage through fear and scare tactics.

The persuasiveness of these “expert” witnesses is usually apparent but the background of the individuals is often not so apparent. For instance, as recounted in the Milwaukee Journal, 24 March 1953, there was a Dr. E.H. Bronner of Los Angeles, who stated that he was a chemist. He was an active an-
A fluoridationist who spoke in Seattle, Washington, where fluoridation was defeated and also spoke in Clinton, Iowa. Bronner charged that fluoridation was a poison, part of a Communist plot to take over this country. The Clinton City Council finally decided there was too much opposition to fluoridation. However, after several speeches, the Clinton Herald became suspicious and started investigating. Bronner left town when it was discovered he was an escapee from the Elgin, Illinois, state mental hospital.

There are similarities of these stories from the past to those experienced in the recent unsuccessful San Antonio, Texas, fluoridation campaign. Water fluoridation has now been twice defeated in that city by popular referenda, after the City Council had voted to fluoridate by ordinance. The first setback was in 1966, by a vote of approximately 26,000 to 12,000 in a city of 60,000, and in 1985 by a vote of approximately 53,000 to 49,000 in a city with a 1,000,000 population. In the 1985 effort, a preelection telephone poll of several thousand randomly selected names indicated a 70% favorable opinion in favor of fluoride a few days before the voting. However, in a follow up poll on the day of the referendum, a majority of the respondents indicated that they were still supportive but had not voted. Unfortunately it was voter apathy and not voter opinion that decided the election.

Newspaper cartoon (Oct. 30, 1985) of San Antonio councilman Ed Harrington, a staunch supporter of fluoridation, published two days after he received a dead rat in the mail with an accompanying note reading “We fed this rat fluoride water, and look what happened, you dirty commie.” (Cartoon by John Darkow, courtesy of the San Antonio Light.)
THE ANTI-FLUORIDATIONISTS’ STRATEGY

It is not possible to delineate all the tactics used by the antis over the year long campaign. Instead, examples of strategies will be given that fall into the categories listed by Bernhart and Sprague in their book, *Tooth Robbers and How to Spot Them*. Many of these strategies come directly from a publication by the antifluoridationist National Health Foundation in the mid 1960’s, entitled, *An Action Guide . . . On How to Fight Fluoridation in Your Area.*

As expected, at the first sign of fluoridation activity in San Antonio, a local antifluoridation “Pure Water Committee” appeared on the scene. All the faithful local antis were advised to write letters to the editors of the city newspapers, to participate in local radio talk shows and to write to their City Councilmen to insure that the public was alerted to the latest “dangers” of fluoridation. Information detailing these alleged “dangers” was made available to the City Council.

A major weapon of the tooth robbers was the “laundry list.” This list, when combined with the Big Lie, was used as effectively in San Antonio as at Stephens Point thirty five years earlier. This strategy called for a rapid-fire cluster of allegations or “concerns” about fluoridation from a group of fluorophobics. The purpose of the strategy was to confuse the public — which it succeeded in doing. In most cases, the antis were more interested in asking their questions for public consumption than in receiving an answer. For example, one of the voiced “concerns” about fluoridation was quoted from a German newspaper reporting an alleged fluoride-accelerated aging process observed (by individuals with unknown credentials) deep in the hinterland of Turkey. To respond to such a foreign newspaper item without additional information was difficult, and by the time the answer was found, the antis had moved on to another bizarre claim. At one time during the campaign, even AIDS was linked with fluoride. The antis soon realized that this “information” was counterproductive since the average Texan had a totally different perspective on the spread of AIDS as compared to the fluorophobics. A great number of quotations were made from reports written by antifluoridationists. They also used unsubstantiated statements attributed to individuals long dead. These were understandably difficult to confirm, but once the voice had spoken from the grave through a fluorophobic proxy, the statements became the truth in the ears of the doubtful. The Big Lie is the natural accompaniment of the “laundry list,” and has been used repeatedly in every fluoridation campaign since Stephens Point. President Kennedy, in a 1961 Commencement Address at Yale University, summed up the problem faced by the pro-fluoridation forces: “The great enemy of the truth is very often not the lie — deliberately contrived and dishonest — but the myth, persistent, persuasive and unrealistic. . . . and no matter how baseless the allegations are, if they go unchallenged, become accepted as truths.” The antis used the Big Lie and the myth and persistent repetition with disastrous effect. Letters to the editor advised people to run their water every morning for five minutes to rid the faucet of concentrated fluoride; others pointed out how natural fluoride that was in the aquifer was good, and that any artificial supplements of the same fluoride to the same water system were bad. Fluorides were also said to cause green hair and aging. These facts must be true, people said, because the letters to the editor said so, callers to the radio shows said so, and the antifluoridationist spokesmen from out of town had said so. The Big Lie had now become the big truth in the eyes of many.

Equally damaging were four radio talk show moderators with one eye
on the station ratings but with ears deaf to the scientific evidence. One of
the programs ran for three hours in the morning, two in the afternoon and
one in the evening. Altogether, they provided a wide local forum for a con-
tinuous barrage of allegations made by anonymous callers. The scenarios
that were recited over the radio were written so as to reinforce letters to the
editor or handouts by the local Pure Water Committee. These radio outlets
provided free time each day, and when continued eight hours per day over
eight or more months certainly had an influence on the outcome.

Then there were the fluorophobic "experts" from out of town. The anti-
fluoridationists have only a few advocates whom they persistently call upon
as "experts." These individuals have poise and effective delivery methods
that have been honed by confrontation in many previous fluoride campaigns.
The price of a visit by such a spokesperson can be high; according to the
newspaper, the cost of a visit by one was $6,715. Three such antifluoridation
advocates came to San Antonio. The combined number of scientific publica-
tions for the three, as listed by the National Library of Medicine, did not
exceed a dozen, most being either letters to the editors, or reviews of other
individuals' work. They had no extensive laboratory or clinical research
studies to substantiate their claims to expertise. However, when they did come
to town, they were accorded free air time. The incoming phone calls follow-
ning their presentations appeared to be prearranged questions favoring an
anti-fluoridation stance. The fact that the presence of the "experts" increas-
ed the listening audience was not missed by the talk show moderators even
though their credentials were never questioned.

There was also a "dirty tricks" department. The Councilman who in-
troduced the motion to fluoridate the water supply received a package con-
taining a dead rat allegedly killed by fluoride. In the newspaper cartoon of
the following day, the Councilman was portrayed as having the aplomb to
observe that "at least the rat had perfect teeth" (Fig. 1). Charges were made
that there was a conspiracy by the U.S. Public Health Service, the University
of Texas Health Science Center at San Antonio, the Bexar County Medical
Association, the San Antonio District Dental Society and the Aluminum
Company of America (ALCOA) to provide a market for ALCOA to dispose
of its waste fluoride. One anti-fluoridation Council member even stated that
the names of the dental and medical conspirators were in a safe. However
the names were never made available, partially because ALCOA had not sold
any fluoride since the early fifties, but mainly because the allegations were
untrue.

To complicate health and economic matters, a Mr. C.A. Stubbs, the presi-
dent of a local homeowners-taxpayers' association, like Mr. Skalski of
Stephens Point, actively campaigned against water fluoridation on the basis
that it would raise taxes. In truth, however, the State of Texas Health Depart-
ment had guaranteed more than 50% of the installation cost, an offer which
over a ten year period of time would have resulted in a cost of approximate-
ly twelve cents per person per year, and a total saving of an estimated 1,000,000
children's teeth from dental decay.

WHAT MUST PRO-FlUORIDATION FORCES LEARN FROM ALL THIS?
The same lessons learned at Stephens Point are applicable to all fluorida-
tion campaigns. It is necessary to have street corner sessions, it is necessary
to confront, and it is necessary to talk constructively about the safety and
benefits of water fluoridation. Unfortunately, there continue to be the same
repeated half truths, outright lies, myths, misrepresentations, misquotations
and out-of-context statements that have heretofore been highly effective in blocking water fluoridation. There is a need to develop responses to the propaganda tactics of the antfluoridationists which will be easy for the uninformed public in all parts of the U.S. to understand.

There is a need for an active cooperative national network to be as effective in fostering water fluoridation and the antfluoridationists are in attempting to block fluoridation. Water fluoridation is a political issue. The background and beliefs of antifluoridationist spokespersons and antifluoridationist organizations should be open to public scrutiny and their rhetoric should be judged against their expertise. Health is too important to be determined by uninformed zealots.

When a fluoridation campaign commences, there should be sufficient lay manpower available to the profluoridationists to use the free newspaper space and radio and TV time to the same extent as the antis. There should also be sufficient manpower and commitment to carry the campaign through a successful Council action, through a possible referendum effort, and when necessary, through the courts to defeat efforts to thwart the will of the people. Since water fluoridation has been made a political issue by the fluorophobics while still being a continuing health need for society, any defeat at the polls should only mark the beginning of an interval until the issue can again be voted on. This concept is especially important when the issue is won or lost by a few thousand votes in a city of a million people. The less emotional interval between elections should be dedicated to the education of the unknowing and the uncommitted, and to the greater participation of a great number of citizens who support water fluoridation.

Legal guidance is an essential ingredient of a water fluoridation effort. During the campaign it is often necessary to block frivolous lawsuits launched by the anti-fluoridation forces. There is a need to secure compliance with Federal Communications Commission regulations for equal radio and TV time. This should not be contingent on a program moderator's requirement for a debate when profluoridationists desire time, when antifluoridationists are allowed uncontested presentations. Of critical importance is the need to establish a legal precedent as to whether verbal terrorism, i.e., macabre scare and fear tactics are legally acceptable under all circumstances.

Dr. Bull at the 4th Annual Conference for State Dental Directors in 1951 stated, "I don't believe you can win approval of any public health program where there is organized opposition... I mean clever, well thought-up opposition." This was a prophetic statement. The fluorophobics have been clever; they have planned well; they have used the truth intermixed with lies; they have used the law to subvert the rule of law and they have been remarkably successful in influencing people to vote for dental disease for themselves, their families and their communities. On the other hand, there now exist preventive methods to practically eliminate caries, with water fluoridation being the necessary foundation to reach such an objective. It is unfortunate that children, especially, should have to suffer pain and facial deformation simply because they live in an area where there is not enough natural or supplemental fluoride in the water. It is even more shameful for communities to continue to permit this wholesale child abuse. It is now time to ask the fluorophobics, "Why do you want to damage the teeth of our young, our old, our handicapped and our poor?"
REFERENCES

8. Bernhardt and Sprague, op. cit.

(This paper was presented at the 35th Annual Meeting of the American Academy of the History of Dentistry, October 17, 1986, Miami Beach, Florida.)

DR. HARRIS is professor, Department of Community Dentistry, The University of Texas Health Sciences Center at San Antonio Dental School, San Antonio, TX. Requests for reprints should be made directly to the author. His address is Route #1, Box 1622, Boerne, TX 78006.

SOLILOQUY UPON A TOOTH

To ache, or not to ache, that is the question —
Whether 'tis nobler in the jaw to suffer
The pangs and anguish of outrageous toothache,
Or to take forceps 'gainst a mouth of troubles,
And by extracting end them? To lie (but sleep
No more), or, by a wrench, to say we end
The toothache, and the thousand natural shocks
That teeth are heirs to — 'tis dental surgery
Devoutly to be wish'd. To cry — to weep;
To weep! perchance to scream; aye, there's the rub,
For in that throbbing pain what pangs may come
(When we have shuffled off the hot salt bag),
Must give us cause: There's the respect
That makes calamity of many teeth!

William Manning
Johnston's Dental Miscellany
Vol. 3, No. 34, October 1876.
The Status of Dentistry at the Time of Frederick the Great: 1712-1786

—Rolf Will, Dr. med. dent.
Mannheim, West Germany

Having recently observed, on August 17, 1986, the 200th anniversary of the death of the king of Prussia, Frederick II, it is appropriate that we examine his relationship with dentistry. As Commander-in-Chief of a mighty empire, as a politician and a philosopher, 
Friedericus Magnus has been frequently quoted, interpreted and opalescently portrayed. However, what kind of significance can be associated with the Preussenkonig and dentistry?
Two issues can best be examined: the level and development of dentistry during his lifetime and during his governmental control and also his own dental ills and the circumstances surrounding these problems.

The development of dentistry during 18th Century in Prussia was remarkable. In spite of a multitude of problems and different priorities between Friedrich II and Friedrich Wilhelm I (Frederick II's predecessor — also called the Soldatenkonig or “king of the soldiers”), the House of Hohenzollern contributed significantly to the development of dentistry as a unique profession. The origin dates back to November 12th, 1685 as is noted in the medical enactment of the Elector. According to this enactment, national registration was necessary for the practice of this healing profession. This is the first time the name Zahnarzt (dentist) officially appears in the Prussian Medizinaledikt, written in 1713, which is the renewal of an edict written in 1685. This confirms that the name Zahnarzt was introduced for the first time by Friedrich Wilhelm I in 1713. Also, at this time, legislation and regulations in the medical domain of Prussia were much more advanced than in other European and Germanic countries.

Initially, the application and subsequent enforcement of national registration was unsatisfactory. However, in the last few decades of the 18th century, during the reign of Frederick II, these policies commanded greater respect and adherence. This might be directly related to the further development of Prussia in the fields of social and domestic affairs.

On May 19, 1756, Frederick II became acutely cognizant of the importance of quality dentistry. On this day Philipp Pfaff, a former Kompaniechirurg (surgeon of the company of the first Silesian war) handed over a book and a letter to the Prussian king entitled Dissertation Concerning the Teeth of the Human Body and Their Maladies (Fig. 1).
Frederick II appreciated this first textbook about dentistry, which was written in the native German language. Until then in that country dentistry had always been considered a small addendum to surgery. Additionally, it is remarkable that this treatise was the work of an experienced, practicing professional and not a university professor. Even today his suggestions on oral hygiene and other dental treatments are most enlightening and practical, and the text (which is available as a reprint) is very interesting and informative to read.

Frederick II must have recognized Pfaff's talents, for in that same year he appointed him "Dentist at Court" and later even Hofrat (royal councilor) and "privileged surgeon". With his practical experience and depth of knowledge, this "Dentist at Court" (the first one in all of Germany) was very much ahead of his times. However, correspondence between the King and Pfaff indicates that the monarch did not show his appreciation to Pfaff for his dental expertise by spoiling him with too many material favors. Still, the Preussenkonig was very fortunate for having met this dental genius. Already, at this early time, Pfaff had written that teeth are not only implements for eating but also necessary for proper pronunciation and facial beauty. He also wrote a book to enable the poor to help themselves with their personal oral hygiene, because they didn't have the necessary support of a skillful dentist. During that time attitudes of this nature were very unusual.

The fees for medical and dental treatment during the 18th century were established by the Medical Enactment. According to this document, the cost of a visit and prescription by dentist or physician used to be 8 groschen. This was the salary a servant earned in one week or the combined salaries of a cook or maid. A dentist's salary can be put on the same level. However, today the relative expense for medical and dental treatment has declined considerably. Also at that time, a kind of social insurance arose and was put into effect by the government. Although the surgeons were not enthusiastic

**Fig. 2.** The beginning of the handwritten will of Frederick the Great. Curiously, it is written in French.
about the idea, four Armenchirurgen (surgeons for the poor) were installed in Berlin in 1736 with a yearly salary of 50 Reichstalern (1 Taler of 1786 equals about 24 US-Dollars today; 1 Groschen 1786 equals 1 US-Dollar). The expenses of medical treatment were supposed to be paid by the sovereign or his lords. Unfortunately, this did not happen regularly. In the second half of the 18th century, funds allotted for the sick gained more and more importance, with the Zunft (corporations) being obliged to financially support necessary medical treatment.

Frederick the Great also mentioned the need to support medical treatment in his last will and testament. “I recommend to my heir of the throne with all the warmth and affection I am capable of giving, all those good officers who followed me during the war. I also ask him to take care, especially, of those officers who belonged to my suite, that they will not be dismissed and that not one of them will die, burdened with illness, in misery.” (Fig. 2)

In the statistic recorded for the causes of death in Berlin during the reign of Frederick the Great, 402 deaths in 1784 and 478 deaths in 1785 were mentioned as having been caused by dental maladies. About half of those who died were juveniles. In relation to the total population of the time, nearly 10% of the total number of deaths were caused by dental illness. These figures reflect ignorance of the importance of proper oral health care at that time, and also point out the epochal initiative of Philipp Pfaff to remove this scourge. Interestingly, tooth ailments were the fourth leading cause of death.

Unfortunately, there’s not too much known about the dental problems of Frederick the Great. A few quotes and hints in literature do at least confirm that he had lost some teeth. In 1758 — at the age of 46 (Fig. 3) — he wrote about himself: “My hair has turned gray, my teeth are falling out and my face is furrowed.” In one of his letters, written in 1779, he states that he is not able to play his beloved flute any more because he has lost all of his front teeth. He also reports that he doesn’t eat supper any more like other older persons, but only drinks a cup of cocoa. Of course, his bad oral hygiene and damaged teeth probably contributed to further medical problems.

There is no information whether or not Philipp Pfaff, who had died twenty years earlier in 1766, actually treated Frederick II. Also, the successors of Pfaff left no drawings or reports on dental treatment concerning the king’s teeth. Presumably, however, the king consulted the dentist Pfaff. Otherwise he would not have shown his appreciation for him by appointing him “Dentist at Court” and later royal councillor.
At the time of Frederick II, functional and esthetic dentures which are made today were not available. It can also be assumed that the king would have been an infrequent patient because he didn't trust medical doctors and even called them "incapable witnesses of our pains." But by studying his features and the form of his face conclusions regarding his dental condition can be drawn.

Iconographic investigations supply a lot of valuable information. A medal struck on the occasion of his death in 1786 shows his sunken features in great detail. A comparison with the death mask proves that this representation is realistic, as is a bust by the sculptor Eckstein who created it according to the death mask (Fig. 4, Fig. 5). Concerning the look and face of the death

Fig. 4. Death mask of the king, August 17, 1786.
Fig. 5. Bust of Frederick II by Eckstein, sculpted in accordance with the death mask.

Fig. 6. Frederick II at the age of 28.
Fig. 7. The king at age 74, the year of his death.
mask of Frederick the Great, a historian once told a critic of the king of Prussia, "You may condemn him, but first you have to look like him."6

With the help of contemporary paintings, one may see the changes starting from the time he was a young man of 28 to an aging and old man. (Fig. 6, Fig. 7). The hollow upper lip points to a loss of some front teeth. The death mask also gives evidence of this change in his dental condition.

At least 2 people who are alive today have been able to look into the face of Frederick the Great. The first time this happened was in February 1945, when the mortal remains of the two kings — Friedrich Wilhelm I and Frederick II — were put into new coffins in Potsdam by Hauptmann Klassen, and again in 1952 when the coffin was opened another time in the Castle Hohenzollern. Hauptmann Klassen reports that the king was well preserved although incredibly small as he lay in his coffin? The well known Order of the Silver Star was still gleaming on the left side of the dark blue uniform. Frederick was wearing his riding-boots made out of soft, black leather, very much wrinkled.

Unfortunately, we know little about the dental state of Frederick the Great, even though he was responsible for elevating and promoting dentistry as a respected profession. The dental secrets of this Prussian king lie forever safely at rest.

REFERENCES


DR. W.L. is a specialist in oral surgery. His address is Mollstrasse 56, 6800 Mannheim 1, West Germany. Requests for reprints should be made directly to the author.
The True Discoverer of the Dental Air Turbine Handpiece, Sir John Walsh of New Zealand

—Malvin E. Ring, D.D.S.
Rochester, New York

There have been conflicting claims to priority of discovery of the air turbine handpiece. Overwhelming evidence points to the fact that Sir John Walsh led the field in developing the first true air driven turbine handpiece.

The June, 1986, issue of the Australian Dental Journal carried an unusually interesting and informative article on the history of the dental handpiece.1 Because no mention was made in the article of the contribution of Dr. Robert J. Nelsen, inventor of the water-driven dental turbine handpiece, Dr. Malvin E. Ring wrote a letter to the editor of that journal, criticizing that lack and pointing out that Nelsen must be considered the inventor of the turbine handpiece.

As a consequence, the February, 1987, issue of the Australian Dental Journal2 carried a lengthy article as a rejoinder by the author, Dr. R. R. Stephens, which makes abundantly clear that the true discoverer of the air-turbine handpiece was Sir John Walsh and members of the Dominion Physical Laboratory of Wellington, New Zealand. Walsh, in 1947, had approached the Ministry of Scientific and Industrial Research of New Zealand and obtained a grant of 250 Pounds for the necessary developmental work to be carried out in the D.P.L. By July 1949 the team had produced a contra-angle handpiece

Fig. 1. The final model of Walsh's air-turbine handpiece now in the collection of the Commonwealth Inventions Development Board in Canada. (Photo courtesy Dr. R. R. Stephens.)

with a speed of 60,000 RPM achieved by feeding compressed air to a miniature turbine located in its head (Fig. 1). A patent for this instrument was applied for by the New Zealand government in October, 1949 and the patent was granted November 27, 1950 to John Patrick Walsh (Fig. 2). Dr. Walsh then
Dear Doctor Nelsen:

It has been in my mind for the past year to write to you regarding your article in the A.D.A. Journal of September 1953, in which you describe a hydraulic turbine contra-angle handpiece. It has taken me a year to get around to it.

My reason for writing to you is that I have been very interested in the development of high speed cutting instruments for some years. Back in 1948 I was playing around with the idea of a high speed handpiece driven by compressed air, in fact I went so far as to design one, somewhat similar to yours, on which I took out a provisional patent. After running into insuperable difficulties in the matter of lubrication and cooling, I allowed the patent to lapse and returned to wishful thinking. On reading your excellent article my immediate reaction was why the heck didn't I think of that.

I would like to know what progress you have made with this handpiece. I would like very much to be able to get hold of one, if such is possible, the handpiece alone would be all that I would need as I could have the pump unit made up here. I was sufficiently impressed with the results I obtained with a very cumbersome industrial air turbine (the de Sutter) that I feel convinced of the future application of high speeds in dental cutting instruments.

I would be most grateful for your assistance in this matter. My dental practice is mainly conservative dentistry and I am most anxious to be able to progress in the manner of cavity preparation.

With sincere good wishes and greetings from "down under"

Sincerely yours,

J.M. Robinson.
January 25, 1954

Dr. Robert J. Nelsen  
American Dental Association Research Fellowship  
National Bureau of Standards  
Washington 25, D.C.

Dear Bob:

Thanks for your recent letter which arrived while I was having a brief holiday. I would like to congratulate you on the very complimentary comment which you received from Dean Walsh. I had the pleasure of meeting him in Ireland in 1952, and came to know that he is highly critical of some of our efforts in this country. So far as I know, your work is among the very little which has received his unstinted praise.

We have had discussions in the staff about some of the too obvious methods of dental health education and I do not believe we are engaged in any at the moment. It is, however, a thing to watch, and I appreciate your comments regarding it.

I have asked both the Editor and the Business Manager to review your comments regarding recent advertising in The Journal in order to see if our current policy should be altered or tightened. Thanks very much for your thoughtfulness in sending me your views.

I understand that your father has been ill and do hope that he is on his way to recovery.

Cordially,

Harold Hillenbrand, D.D.S.
Secretary

HH:rs
Dr. Robert J. Nelson,
National Bureau of Standards;
WASHINGTON D.C.
U.S.A.

Dear Dr. Nelson,

I would like to cordially congratulate you and your co-workers on the success you have achieved with the hydraulic high speed contra-angle handpiece as reported in the September issue of the J.A.D.A.

As you know, we have been working on this problem for over five years and I was confident that somebody somewhere would eventually overcome the considerable engineering difficulties. All along I had the feeling that the United States would be the country that would get there first.

Now I would like very much to receive about half-a-dozen reprints of your article to send to various people in the British Commonwealth who either failed to produce an effective handpiece for me or else told me it was impossible anyway. The impossible has been achieved. I would also be very grateful if you could let me know if it is possible for us to purchase the equipment described in your article or any improved model that you have made since. We are anxious to continue the clinical work on the high speed drill which I am firmly convinced is a great contribution to dental progress.

Once again my cordial congratulations and good wishes for your continued success.

Yours sincerely,

J.P. Walsh
Dean
MEMORANDUM

TO: Officers of the American Academy of the History of Dentistry.
The Editorial Board of the American Academy of the History of Dentistry.
Other persons interested in Dental History.

FROM: Robert J. Nelsen


References:
(3). Walsh, J.P., Personal communication, 10 Dec., 1953 (attached).

M.E. Ring, reference (1), mistakenly attributes to Walsh the development of a useable turbine contra-angle handpiece when actually (1953) Walsh had failed to do so by his own admissions. See references (3) and (4). Note that his statement of failure, reference (3), is dated 10 December 1953, just two months after Nelsen's September 1953 publication in the JADA, reference 2, of the first clinically useable turbine contra-angle handpiece while he was a Research Associate in the American Dental Association Program at the National Bureau of Standards.

The Bulletin, in the interest of accuracy, should bring this significant information regarding Walsh's personal admission of failure to the attention of its readers and correct the misleading implications in the story by Ring.

Received 31 December 1987
H. BERTON McCauley
Secretary-Treasurer, AAHD
Fig. 2. The original drawings which accompanied the application for a patent, dated October 27, 1949. The patent was granted to Dr. Walsh on Nov. 27, 1950.
reported on the successful use of this handpiece in a doctoral thesis "Vibration Sensibility in Teeth" which he submitted to the Dental University at Melbourne in 1950 for the degree of Doctor of Dental Science.

An unusually interesting article in the *British Dental Journal* in 1974 described how Dr. Walsh got the inspiration for his handpiece:

The origin of the modern high-speed turbine handpiece can be traced back to the work of John Walsh at a Melbourne base of the Royal Australian Air Force in 1945. At that time Walsh, medical and dental officer at the base, was engaged in testing the hearing of discharged airmen, a routine test which left him with some free time. The conductivity of teeth and bone to sound was well known and, at that time, was widely believed to be the major contributory factor to the unpleasantness of the dental drill. Using the tuning forks of various frequencies which were being used in the hearing tests, he decided to test the upper limits of the vibration sense of bone which he had detected at frequencies below about 100 Hz in idle experiments on his own teeth. He discovered that the maximum unpleasantness of vibration sensation occurred about middle C, 256 Hz, and that frequencies two octaves higher, 1024 Hz, were not perceived as vibrations at all. This crucial discovery led Walsh to suppose that higher speeds of rotation of the dental drill would alleviate the patient discomfort which he had now traced to vibration as well as sound.

This is persuasive evidence that to Dr. Walsh must be ascribed the credit for the conception of the air driven handpiece as a means of overcoming vibration. Too often, the true discoverer of a new invention or technique is denied recognition justly due him, as witness the case of dentistry's great Horace Wells, discoverer of anesthesia. We must not let that happen again!

A fair evaluation of the place of Walsh's work in the development of the turbine handpiece was made by Cherry, Gibbons and Ronayne of the Department of Liberal Studies in Science of the University of Manchester, England in their article of 1974:

It is certainly true to say that Nelsen's was the first handpiece using the turbine principle to achieve sustained running and the Turbojet was the first commercial instrument to use the turbine principle. But it was not an air-driven turbine and its speed was necessarily limited, by the nature of the fluid drive, to about 75,000 rpm, a speed which was quickly surpassed by the gear-driven Page-Chayes handpiece introduced early in 1956. The engineering problems associated with air-turbine drive were solved by J. V. Borden who was associated with Nelsen's project at the National Bureau of Standards. Borden took his ideas for an air-turbine drill to the Dentists' Supply Company, who introduced the Airotor in 1957, and this is widely regarded as the precursor of the present generation of ultra-high-speed handpieces. . . . Yet there had been in existence for 6 years prior to the introduction of the Airotor an instrument (Walsh's, Ed.) which, mechanically, bore a close resemblance to it.

While it cannot with certainty be said that Walsh's contribution to high-speed dentistry was essential for the eventual development of the high-speed air-turbine drill, the fact that this highly successful innovation was based on the principle of an air-turbine entitles his pioneering work to a place of prominence in the history of dentistry.

Dr. Stephens, who is now professor, Department of Restorative Dentistry at the University of Queensland Dental School in Brisbane, Australia, has kindly sent me the supporting data testifying to Sir John Walsh's priority as discoverer of the air turbine drill, including the original patent application dated October 27, 1949, years ahead of any other worker in the field.
He had also sent to Sir John, who is now retired and lives in Auckland, New Zealand, a copy of my letter to the *Australian Dental Journal* as well as Dr. Stephens' own persuasive answer to my objections. Sir John answered Dr. Stephens as follows:

Dear Dr. Stephens:

Thank you for your letter, with the photocopy of Dr. Malvin Ring's letter, together with a copy of your long and detailed reply which is to be published in the February issue of the *Australian Dental Journal*.

As far as I am aware, there is nothing incorrect in your statement.

Your long experience and extensive research in this field makes you well qualified to offer authoritative judgement and I accept gladly your final conclusion.

I hope that the American historians will do the same!

Yours sincerely,
John Walsh

American dental historians must needs accept the overwhelming evidence that to Sir John Walsh is due credit for giving the profession the marvelous instrument that has so revolutionized the practice of dentistry. It is good to correct an error while the true benefactor is still here to enjoy the recognition.

Sir John tried in vain to convince the American dental community of his priority of discovery by means of a letter to the *Journal of the American Dental Association* in 1965. However, the community of dental historians did not pick it up. It is hoped that this short outline of the facts will finally set the record straight!

REFERENCES

4. *Ibid*

DR. RING, author of *Dentistry — An Illustrated History*, is editor of the *Bulletin of the History of Dentistry*.
The rise of Islam and its religious fanatacism transformed the nomadic tribes of Arabia into a conquering nation whose impact greatly affected extensive parts of Asia, Africa and Europe. The Arabians acquired fame not only through force of arms but through cultural development of art and science within the limits allowed them by their religion. Arabian science and, in particular, Arabian medicine, represented not only great achievements of the eastern world in the Middle Ages, but stimulated the rise of European medicine in the later Middle Ages and Renaissance.

The writers of the period wrote in Arabic although the majority of them were Spanish- or Persian-born, and many of them were Jewish. One of their major contributions was the translation into Arabic and Hebrew of many of the works of such classical writers as Pliny, Galen and Aristotle, works which were relied on by the early European medical community. Much of medieval Renaissance stomatology and dentistry was derived directly from Arabic writings, in particular those of Avicenna and Albucasis.

While Avicenna was perhaps the greatest intellect of Islam and author of one of the best known medical texts of all time, The Canon, he did not study in great detail the anatomy and physiology of the teeth. His contributions were seldom original and he repeated much of what Galen said before him. He stressed the importance of oral hygiene, warning against dentifrices containing hard or coarse particles which could injure the tooth surface. He discussed jaw fractures, emphasizing the importance of the proper way of reducing them. As with his predecessors, he was of the opinion that extraction of a firm tooth should be avoided as much as possible.

Among the Arabian authors who contributed the most to the art of dentistry was the physician, Albucasis (Abu-al Qasim Khalif ibn'Abbas al Zahrawi). He, more than any of the Arab physicians, paid great attention to the care and treatment of the teeth.

Albucasis was born in Cordoba, Spain, around the year 936, and died there in 1013. It was there he received his education and authored his great treatise Al-Tasrif (The Method), an encyclopedia of medicine and surgery. The section detailing the description and use of surgical instruments, translated into Latin as "De Chirurgia", brought him honor and distinction as the first important oral surgeon.

"De Chirurgia" was divided into three books: the first spoke of all the diseases which could be treated by cauterization; the second described all the operations performed by extracting, cutting or perforating; the third treated fractures and luxations region by region.

Chapters XIX, XX, and XXI of the first book refer to diseases of the teeth and gums:
When in the lower part of the gums, or in the palate, there appears a little tumor, which afterward becomes purulent and opens and changes into a fistula, against which no medical remedy is of any use, it is necessary for thee to take a cautery corresponding in size to the aperture of the fistula, and after having heated it, to introduce it there and to keep it applied there until the cauterizing iron reaches the bottom of the fistula and beyond. This thou shalt do once or twice and then shalt use fitting medicaments until a complete cure is obtained. This is attained when suppuration ceases. Otherwise one cannot do less than uncover the bone and extract that part of it which is diseased.

When through excess of moisture the gums become flaccid, the teeth loose, and of no use are the remedies employed by thee, thou shalt lay the patient's head on thy lap, and after having applied to the tooth, where it borders on the gum, the end of an appropriate little metal tube, in this thou shalt quickly introduce the cautery of which mention will be made in the following chapter; and thou shalt prolong the application as long as suffices to let the patient feel the heat right to the bottom of the tooth. This thou shalt repeat as often as thou shalt think necessary. Then the patient shall keep salt water in the mouth for an hour. By effect of such a cure, the corrupted moisture will dry up, the gums will regain their tone, and the tooth its firmness.

When toothache depends upon cold, or if there exist some worm in the tooth, and the medicaments are of no use, recourse must be made to cauterization, which in such cases may be performed in two ways, viz., either by means of butter or with a cautery. Desiring to use butter, some of it must be warmed in an iron or copper spoon; a little cotton must then be wrapped around the extremity of a probe, dipped into the boiling butter, and then immediately applied to the tooth, keeping it there in contact until it has cooled. This must be repeated several times, so that the action of the heat reaches right down to the root of the tooth. If thou preferest, thou canst use cold butter, applied to the aching tooth by means of a little tuft of wool or cotton, upon which thou shalt lay a red-hot iron; prolonging the application of this until the heat has reached the very root of the tooth.

To perform the cauterization directly with the iron, thou must first rest on the tooth a small tube of iron or copper, designed to preserve the neighboring parts from the action of the heat, and which must, therefore, be of sufficient thickness. Through such a tube thou shalt apply on the tooth a cautery . . . and keep it there until it is cooled. This thou shalt do several times. The pain will cease the same day or on the morrow. It is, however, necessary that after cauterization the patient should keep his mouth, for an hour, full of good butter.

Albucasis was the first author who recommended scrupulous cleaning of the teeth to eliminate dental tartar. Below is the chapter "On the Scraping of the Teeth."

Sometimes on the surface of the teeth, both inside and outside, as well as under the gums, are deposited rough scales, of ugly appearance, and black, green or yellow in color; thus corruption is communicated to the gums, and so the teeth are in process of time denuded. It is necessary for thee to lay the patient's head upon thy lap and to scrape the teeth and molars, on which are observed either true incrustations, or something similar to sand, and this until nothing more remains of such substances, and until also the dirty color of the teeth disappears, be it black, or green, or yellowish, or of any other color. If a first scraping is sufficient, so much the better; if not, thou shalt repeat it on the following day, or even on the third or fourth day, until the desired purpose is obtained.
When discussing the extraction of teeth, his instructions are virtually the same as are used today and would seem to represent considerable sophistication in technique and instrumentation. Albucasis begins by saying that one should use every means possible to cure an “attack of odontalgia” and to be very cautious in deciding to extract a tooth. When one couldn’t avoid an extraction, the practitioner was to first ascertain which was the offending tooth, citing that referred pain could often deceive the patient.

He states:

The aching tooth having been well ascertained, it is necessary to detach the gum from the tooth, all around, with a sufficiently strong scalpel. Then either with the fingers or with a light pair of forceps the tooth must be shaken very gently, until it is loosened. Then the surgeon, keeping the head of the patient firmly between his knees, applies a stronger pair of forceps and extracts the tooth in a straight direction, so as not to break it. If it is not possible to draw it out, one of those elevators must be taken which the author advises for the extraction of roots, and by insinuating it under the tooth the surgeon must endeavor to extract it. When the tooth is corroded and hollow, it is necessary to fill the cavity with lint, compressing it hard inside with the end of a probe, so that the tooth may not break under the pressure of the instrument. In all cases, the operator must take great care not to break the tooth, for if this happens the remaining part will give the patient still greater suffering. It is necessary, therefore, to avoid acting like the ignorant and foolish barbers, who in their temerity do not observe any of the above mentioned rules, and therefore very often cause the patients great injuries, the least among which is the breaking of the tooth, the root being left in the socket, or else the taking away, together with the tooth, of a piece of the maxillary bone . . . After the extraction the patient must rinse his mouth with wine, or with vinegar and salt. If, as often happens, hemorrhage is produced,
a little powdered blue vitriol must be applied inside the wound; and if this is not sufficient, the part must be cauterized with a red-hot iron.

Another interesting chapter deals with the extraction of roots and fragments of the maxillary bone:

When, on extracting a tooth, this breaks, so that the root remains in the socket, it is necessary first of all to soften the part, by applying for a day and a night, or for two days, some cotton wool well smeared with butter; then attempts must be made to extract the root with a pair of forceps... If this is not successful, it is necessary to remove with a scalpel the whole of the gum which covers the root; then under it must be insinuated a small elevator... If not even in this way can the end be attained, recourse must be made to an instrument which seems to be more suitable.

Albucasis recommended ligation for the stabilization of loose teeth:

When, in consequence of a blow or fall, one or more teeth have become loose so that the patient cannot bite his food with them, if the use of styptic remedies has been found of no use, it will be necessary to bind and make such teeth firm by a gold or silver wire. Gold is to be preferred as being unalterable, whilst silver in a few days turns green. Having chosen, therefore, a suitable gold wire of perfectly uniform consistency, it must be passed at its middle part between two firm teeth, that is between the two nearest on one side to the loosened tooth or teeth; then, by binding tightly around the sound tooth and each of the loosened teeth the two lengths of the wire and crossing them in the dental interstices so as to form a kind of network, the sound and firm tooth of the opposite side will be reached, and this too must be wound around in a mesh, as it were, of the said network. Then, turning back, the same operation must be repeated, but inversely, until the point of departure is reached. All this must be done with much skill, so as to render the loose teeth completely unmovable. When the wire is tied, this must be done near the dental roots, so that the knot may not get untied; then with a pair of scissors the remaining part must be cut off and its two ends joined and
twisted with a pair of pincers, hiding them between the sound tooth and the neighboring loose one. Such a ligature should remain in place during a whole lifetime; and in case it should come undone or the wire should break, it will be necessary to renew the operation.

Lastly, the author says that the space caused by missing teeth could be filled with artificial ones made of ox bones and ligated to sound teeth:

The vacancy left by fallen teeth can be filled with artificial ones, made of ox bone, they also being fixed in the manner above described; they will be found not only of advantage from the esthetic, but also from the functional point of view.

When a tooth is irregularly placed, or projects above the level of the others, a deformity ensues which is particularly displeasing in women. The way of correcting this varies according to the nature of the case. It consists sometimes in the simple extraction of the misplaced tooth. But when there exists an intimate (osseous) union of the irregular tooth with another one, it is necessary to operate for the resection of the former with an instrument the shape of a small ax . . . The operation must be performed in many days, not only on account of the hardness of the tooth, but also in order not to shake any of the neighboring teeth.

In summary, not only did the noted physicians and surgeons of the great age of Arabian medicine preserve much of Greek and Roman achievement, but they left a wealth of original accomplishment in oral surgery, stomatology, and clinical medicine. Their achievements represented, to a large extent, the impetus for the rise of European medicine that was yet to come.

DR. HERSCHFELD is in the private practice of dentistry. His address is 3101 Bristol Road, Bensalem, PA 19020. Requests for reprints should be addressed to the author.

WANTED

Complete as well as unbound copies of individual numbers of Vol. I of the American Journal of Dental Science. I would particularly like to see photocopies of the front and back wrappers or outer covers . . . both the insides and outsides of these covers. I am most interested in Vol. I, No. 1 and Vol. I, No. 2.

—Max Geshwind, D.D.S.
184-14 Midland Parkway
Jamaica, NY 11432
I shall begin my presentation with a notice of the immediate reason for Dr. J. Ben Robinson's historically significant decision to found an organization that would promote the idea of dental history as an important adjunct not only to formal dental education but also to the continuing cultural development of the dental profession.

During the meeting of the American Dental Association in 1950, the House of Delegates voted to eliminate the Committee on Dental History. As a member of that Committee, Dr. Robinson was keenly disappointed by the House's abrogative action. Feeling the need for a responsible representation of dental history in the organizational structure of our profession, he began to sound out a selective group of dentists regarding their interest in the creation of an organization for the advocacy of dental history as a subject worthy of acceptance by American dentists.

At the beginning of this dedicated effort Dr. Robinson secured the enthusiastic and productive support of four fellow founders: Milton Asbell, of Camden, N.J.; Harold Faggart, of Philadelphia; Gardner Foley, of Baltimore; and William Hodgkin, of Warrenton, Virginia. This group met in Baltimore and Philadelphia for the chief purpose of writing the Constitution and Bylaws for the governance of the proposed Academy. As the leader of the endeavor, Dr. Robinson sent a letter of announcement to members of the dental profession who had demonstrated an active concern with the values to be derived from the formation of the Academy. This list included all the identifiable teachers of dental history. There were forty-five replies, generally expressing earnest support for the project as outlined in Dr. Robinson's letter.

The first and last paragraphs of this overture form a significant part of the history of the Academy:

The purpose of this letter is to invite you to join in a movement looking toward the creation of a keener interest in the history of dentistry among the members of the dental profession, and of placing greater interest on the study and teaching of dental history in the dental schools. I invite you to meet in Washington, D.C. with a representative group of students of dental history during the 1951 session of the American Dental Association for the purpose of organizing an American Academy of the History of Dentistry.

Having read the replies to Dr. Robinson's letter of invitation, I feel it appropriate that I should offer a brief tribute to the great importance of his role in attracting essential support for his notable contribution as the founding father of the Academy. In school administration and in the various levels and areas of organization, he had achieved strong national recognition for his exceptional qualities of leadership and the incentive influence of his ad-
dresses and writings. In estimating the worth of Dr. Robinson's career in dentistry it is highly relevant to consider his reputation as it is revealed by the host of honors conferred upon him. He was indeed the predominant one to lead the way to the promise and the solid creation of the Academy.

THE FIRST MEETINGS OF THE ACADEMY

There were twenty-one present at the organizational meeting held in Washington on October 16, 1951. Dr. Robinson was chosen to chair the meeting, and during the legislative session he was elected as the Academy's first president. The proposed constitution and Bylaws were read and approved — except for the strangely inappropriate requirement for membership stated in Section 1 of the Bylaws. It was pointed out that if membership were restricted to members of the American Dental Association, then black dentists and non-dentists would be excluded. Obviously such a crass restriction was not acceptable, and it was unanimously voted that it be omitted from the proposed regulatory act. An examination of the thirty-five programs published by the Academy provides strong evidence that representatives of the two groups originally eliminated for consideration as members have indeed contributed with distinction to the success of the Academy.

The first annual meeting of the new organization was held in St. Louis on September 6, 1952. Forty-nine paid up members constituted the charter membership of the Academy; they were from twenty-six states and Puerto Rico. Recently I examined the roster of the charter members. I was nostalgically impressed by the excellent quality of the Academy's beginning members, many of them being leaders of national reputation. Certainly those loyal advocates of the importance of dental history contributed solidly to the eventual establishment of the Academy as a basically viable element in organized dentistry.

Among the recommendations made during the meeting were these: to design a seal and/or insignia for the Academy; to request the American Association of Dental Schools to give effective consideration to the teaching of dental history; and to plan on the bestowal of awards by the Academy to stimulate research and writing in the field of dental history.

Dr. Robinson's presidential address was a stirring call to action in the cause of dental history. I shall quote one paragraph to suggest the spirit and the guiding essence of that opening contribution to the perpetuation of the Academy's thirty-five years of annual programming.

It is a fact beyond question that dental history has been one of the most neglected of the several categories of dental knowledge. The unfavorable position it occupies as a subject of instruction in the curriculums of our colleges, and the lack of active interest shown to it by members of the dental profession have been influenced by a false estimate placed on its practical worth by those who have informally compared its values with those of other dental subjects. Because it seems to lack practical application to immediate problems of dental practice it has been accorded a place low in the scale of relative importance among the subjects included in the dental curriculum, and has been relegated to comparative obscurity in the esteem of the rank and file of the dental profession.

The Treasurer's Report, made by Harold Faggart, had some interesting figures, especially when we look back at them from the distance of 1986: dues collected $240.00; bills paid $123.12 — amount in hand $116.88.

The essays section of the initial program included the presentation of three excellent papers: by Laszlo Schwartz, "John Hunter and the
Physiological Basis of Dental Practice”; by George Denton, “A Reading Public for the History of Dentistry”; and by Nell Talbot, “The Dental Student and the Study of Dental History.” this program formed a memorable example for future meetings to emulate. The luncheon speaker, John F. McDermott, a teacher of history at St. Louis University, has become a well-known regional historian and the author of several books. It was indeed a fine beginning for the nascent Academy.

The Constitution and Bylaws were revised in 1958 and 1980.

The Academy held three joint meetings with the Working Group on Dental History of the Federation Dentaire Internationale and will hold a fourth at its 1988 meeting in Washington. At the 1959 session papers were presented by Dr. Cecconi, of Paris, Dr. DeMaar of The Hague and Dr. Francke of Stockholm; Mr. Donaldson, of London, was the single F.D.I. essayist in 1975.

THE ACADEMY’S AWARDS PROGRAMS

The Academy expressed its intent to establish an Award at its first meeting in 1952. The original Committee on Awards reported on the desirability of an Award: “The bestowal of awards by the Academy would appreciably serve its aims to stimulate interest in dental history and to provide suitable recognition for noteworthy contribution.” However, eleven years passed before a strong recommendation for the proposed Award was made by President Foley in his address at the Atlantic City meeting in 1963. He observed: “There is no Award to encourage dentists and others to research and publish papers and books in the field of dental history. Such an award — like the Welch Medal for medical history and the Urdang Medal for pharmaceutical history — would serve as a strong factor of recognition of the importance of the history of dentistry.”

The decision to create the Hayden-Harris Award, named for the two great contributors to the founding of the world’s first national dental organization, the world’s first dental journal, and the world’s first dental college, was made in the interim between the 1966 and 1967 meetings of the Academy. Presumably because I had been an ardent supporter of the movement to activate the Award, I was given the rewarding task of designing and wording the plaque. That I was assigned also to present the first Award to my good friend and inspiring mentor is one of my favorite Academy memories. Following Dr. Robinson’s recipience, the Award was given to many older members who had begun making contributions long before the Academy’s founding. Perhaps it is time now to make the Award every other year.

The Bremner Award was established by a gift from Dr. M.D.K. Bremner of the continuing royalties from his successful book The Story of Dentistry. However, because the Academy officer appointed had failed to carry out the contemplated use of the award for encouraging dental students to enter the Bremner Contest for essays on dental history, Dr. Bremner wrote to Dr. Robert Thoburn, president of the Academy, that he would withdraw his offer of the Award if the details of activation for the academic year 1959-1960 were not presented for his approval at the 1959 meeting. Realizing that the Academy was very near the point of losing the Award, Dr. Thoburn wrote to me during the summer asking if I could create a plan for conducting the contest and present it at the New York meeting of the Academy. My plan was accepted gratefully by the Academy and approved by Dr. Bremner. I sent out letters to every dean and teacher of dental history urging that they inform their students of the contest. There were five contestants. The three judges of the unidentified papers awarded the first prize to Rolla A. Burk,
of the Baltimore College of Dental Surgery, Dental School, University of Maryland. I conducted the contest for its first eight years.

THE ACADEMY'S PUBLICATIONS

The Academy has been wonderfully blessed by the early beginning and the steady continuance of its publications. The Bulletin of the History of Dentistry, originally a two-sheet publication, had its first number in March, 1953. It was issued monthly until September 1963, except for delayed numbers as a result of the editor's illness. The editor of the Bulletin was Dr. George B. Denton, who, after a period of teaching dental history at the Northwestern University Dental School, joined the staff of the American Dental Association. Dr. Denton had become a highly regarded dental historian, and his selection as editor of the Bulletin proved to be a very fortunate choice by the Academy. His comments on the literature of dental history, both old and contemporary, were an impressive feature of his memorable contribution to the early growth of the Academy in numbers and in the quality of its accomplishments. The A.D.A. gave help to this initial periodical venture of the Academy through its generous assistance in its printing and distribution.

Upon Dr. Denton's death, the editorship was in the capable hands of Dr. Donald Washburn who relinquished it after five years to the current editor, Dr. Malvin E. Ring.

The Academy has been prodigiously benefitted by the journalistic activities of Dr. Malvin Ring. The consistent progress of the Academy has been achieved chiefly by the wide distribution of the Bulletin, which has maintained a fine standard of quality worthy to represent this country's only dental historical periodical publication. Gradually the Bulletin has reached a high point of national and international recognition. Let me express to Dr. Ring the Academy's deeply felt appreciation and recognition of his many years of amazingly extensive contribution to the development of the Academy to its present proudly acclaimed stature.

TEACHING OF DENTAL HISTORY

At its thirty-fifth annual meeting held in Detroit, March 23-26, 1958, the American Association of Dental Schools presented a conference session on the history of dentistry. The chief element of this singular conference was the programming of five essays, all related to dental history as a subject for inclusion in the curriculum of the dental schools. As the last of the presenters, I addressed this subject: "The Use of Library Resources in the Administration of a Course in the History of Dentistry." The conference was the first and last of its kind sponsored by the A.A.D.S. At least, the Academy managed to provide five participants who made a good impression on their audience.

During the last quarter of a century of his lifetime Dr. Robinson expressed to me his delight in witnessing the many achievements of the Academy: well attended annual meetings, the creation of the Bremner Award, the steadily improving publication efforts that culminated in the very worthy Bulletin, and the origination of the Hayden-Harris Award. Our chief founder was proudly gratified to observe the solid character of the organization that he had originally proposed.

The Academy lists 33 honorary members from 9 countries and 535 active members. These shining figures reveal that the Academy has strived earnestly and rewardingly to carry out the objectives of its founders.
PROFESSOR FOLEY, author of the acclaimed book *Foley's Footnotes* and for many years a contributor to the *Journal of the American Dental Association* and *Journal of the American College of Dentists*, is professor-emeritus of the Baltimore College of Dental Surgery, Dental School, University of Maryland. He is also a past-president of the American Academy of the History of Dentistry and the 1971 recipient of the prestigious Hayden-Harris Award. His address is 4407 Sedgewick Road, Baltimore, MD 21210. Requests for reprints should be directed to the author.

POETRY AND THE DENTIST

WOMAN'S MOUTH

The eye has charms — the polished brow,
In beauty arch'd — the swan-like neck,
So snowy white — the rosy cheek —
The Grecian nose and dimpled chin —
Still, the lovely mouth out-charms all,
When regular and beautiful
Are its double row of pearls,
Resplendent in their ruby arch.

Let diamonds in their silver beds,
Darken — out-vie the noon-day sun,
And rubies in their golden frames —
Or choicest stones of earth or sea,
Be-deck the ear, or bosom fair; —
Still the mouth, the mouth's the charm!
Coining the sweetest joys of earth
The rippling fount of crimson hue,
From which all pleasures sparkle — spring!
Nature's first — only master work.
Made perfect by our noble art!

From the collection of Gardner Foley, M.A.
Baltimore, Maryland
A Case of Prosthetic Dentistry in Ancient Egypt

Yoel Blustein, D.M.D.
Noah Stern, D.M.D., M.S.D.
Samuel S. Kottek, M.D.
Jerusalem, Israel

Excavations in ancient Egyptian tombs in the past have uncovered two examples of what are apparently some form of dental prosthesis. However, all indications point to the fact that one of the restorations, which appears to be a fixed bridge, was actually placed post mortem. This paper discusses a find where a tooth still embedded in a skull has remnants of a prosthetic appliance.

The concept of “Ancient Egypt” is related to the period stretching from 3000 B.C. to 300 B.C. The knowledge about dentistry in that period is based upon three sources:

a. Medical papyri containing medical prescriptions relevant to the treatment of various dental problems and the treatment of facial injuries.1,2
b. Tomb inscriptions; some of which reveal the profession of the dead person, in some cases indicating a medical or dental title.3,4
c. Paleopathological findings: in a small number of teeth and jaws, pathological findings, as well as traces of possible treatment, were found.

The objective of this paper is to describe a specific case and to discuss some of the findings related to restorative dentistry in ancient Egypt.

THE FIND

Construction workers, enlarging the plant of the Portland Cement Company in Tura El-Asmant, Egypt, in 1945, uncovered some ancient tombs. Excavation of the tombs for archaeological purposes began in 1952 and was completed in 1953. The excavation of one tomb yielded a skull (Fig. 1) with evidence of dental treatment, and the site was dated to earlier than 300 B.C.5

Fig. 1. The skull found at Tura El-Asmant, Egypt, dating from before 300 B.C. There is a full complement of teeth in both jaws and the labial version of the lower right central incisor is clearly evident.
CLINICAL DESCRIPTION

The upper right central incisor tooth has a mesio-distal channel drilled through it, and through which a silver wire had been passed. The two ends of this wire are embedded into the lingual aspect of the adjacent left central incisor and the right lateral incisor. The right central incisor is still in its original socket in the jaw, but it is broken off at the level of the artificial mesio-distal channel (Figures 2 and 3).

Resorption of the right central incisor's apex is evident in a radiograph (Fig. 4) and the wire can be clearly seen running through the remaining portion of the tooth.

An examination of the skull shows that the lower right central incisor is in labial version in relation to the other teeth in the lower jaw.

DISCUSSION

The ectopic position of the lower right central incisor had probably caused trauma to the upper right central incisor which then became mobile and eventually dislocated.

The mesio-distal channel could have been drilled only while the tooth was outside the mouth. After the channel was prepared and the silver wire passed through, the tooth was

Fig. 2. Palatal view of the skull showing clearly the portion of silver wire projecting from the side of the right central incisor.

Fig. 3. Close-up view of the right central incisor still in its socket, the wire projecting distally to behind the right lateral incisor.
replaced and the wire connected to the adjacent teeth. Apparently, placement of the wire into the lingual aspect was for aesthetic reasons. The means of connecting the wire to the adjacent teeth is unknown. It was, however, not wrapped around the adjacent teeth.

The drilled channel probably weakened the incisal part of the tooth and was a contributing factor in the fracture of the clinical crown.

The exact means by which the mesio-distal channel was prepared is unknown. We assume that this was accomplished by means of a hand bow drill. This tool works in the following manner: the bow moves along a groove which is located on the drill. The drill is activated by back and forth movements of the bow. This type of bow was in use among the carpenters of ancient Egypt (Fig. 5). However, in the literature this bow is mentioned as a tool used by dentists during the same era. Nevertheless, here is evidence, supported by clinical and radiographic findings, that a tooth with a mesio-distal channel was found located in its original place in the jaw and connected with a wire to the adjacent teeth.

Fig. 4. Radiograph of the anterior portion of the upper jaw. Extensive bone resorption can be seen around the right central incisor. The silver wire can be seen passing through the drilled hole in the right central and attached in some fashion to the left central. Although the wire is broken now, it is apparent that it must at one time have been whole.

We would like to relate the finding of this specimen to another similar case, published by Iskander et al. in 1979. Three extracted teeth were found joined by two gold wires (Fig. 6). The jaw from which these teeth came was not found. There is a dispute as to whether the teeth were splinted for therapeutic purposes in a living patient, or were only wired and connected in the process of burial preparation.

We feel that this second presentation, which has features similar to the ones discussed in this paper, supports the theory that wired, splinted, teeth may have been in use in living patients. Moreover, the root of the tooth being replaced in this specimen, which seems to have been partially scaled, is reminiscent of the conic extension pontic which was in use several decades ago.
CLINICAL DESCRIPTION

The upper right central incisor tooth has a mesio-distal channel drilled through it, and through which a silver wire had been passed. The two ends of this wire are embedded into the lingual aspect of the adjacent left central incisor and the right lateral incisor. The right central incisor is still in its original socket in the jaw, but it is broken off at the level of the artificial mesio-distal channel (Figures 2 and 3).

Resorption of the right central incisor's apex is evident in a radiograph (Fig. 4) and the wire can be clearly seen running through the remaining portion of the tooth.

An examination of the skull shows that the lower right central incisor is in labial version in relation to the other teeth in the lower jaw.

DISCUSSION

The ectopic position of the lower right central incisor had probably caused trauma to the upper right central incisor which then became mobile and eventually dislocated.

The mesio-distal channel could have been drilled only while the tooth was outside the mouth. After the channel was prepared and the silver wire passed through, the tooth was
replaced and the wire connected to the adjacent teeth. Apparently, placement of the wire into the lingual aspect was for aesthetic reasons. The means of connecting the wire to the adjacent teeth is unknown. It was, however, not wrapped around the adjacent teeth.

The drilled channel probably weakened the incisal part of the tooth and was a contributing factor in the fracture of the clinical crown.

The exact means by which the mesio-distal channel was prepared is unknown. We assume that this was accomplished by means of a hand bow drill. This tool works in the following manner: the bow moves along a groove which is located on the drill. The drill is activated by back and forth movements of the bow. This type of bow was in use among the carpenters of ancient Egypt (Fig. 5). However, in the literature this bow is mentioned as a tool used by dentists during the same era. Nevertheless, here is evidence, supported by clinical and radiographic findings, that a tooth with a mesio-distal channel was found located in its original place in the jaw and connected with a wire to the adjacent teeth.

We would like to relate the finding of this specimen to another similar case, published by Iskander et al. in 1979. Three extracted teeth were found joined by two gold wires (Fig. 6). The jaw from which these teeth came was not found. There is a dispute as to whether the teeth were splinted for therapeutic purposes in a living patient, or were only wired and connected in the process of burial preparation.

We feel that this second presentation, which has features similar to the ones discussed in this paper, supports the theory that wired, splinted, teeth may have been in use in living patients. Moreover, the root of the tooth being replaced in this specimen, which seems to have been partially scaled, is reminiscent of the conic extension pontic which was in use several decades ago.
Fig. 6. Specimen found by Farid in 1952 near Cairo showing clearly the hole drilled in the incisor on the left and the gold wire passing through it and around the other teeth. It has been dated to circa 2500 B.C.

dentistry in ancient Egypt. We can only speculate that this bridge served actively and functionally in a living individual. The wiring is much more sophisticated than those we have witnessed in the two previous cases, and the teeth were wired effectively and aesthetically.

SUMMARY

Several dental cases are discussed which show intervention in dental pathology as practiced in ancient Egypt. The techniques utilized in various fields of dentistry are astonishing since the era under discussion is prior to 300 B.C.

In this paper, thoughts are expressed about archeological and clinical findings related to dentistry in ancient Egypt. We do not have, however, new scientific evidence that may support the assumption that actual dental treatment was practiced in ancient Egypt.

REFERENCES


DR. BLUSTEIN is a practicing dentist in Tel Aviv. DR. STERN is associate professor and Director, Fixed Prosthodontics, Hebrew University-Hadassah School of Dental Medicine, Jerusalem. He was also visiting associate professor, Department of Crown and Bridge, School of Dentistry, University of Michigan, 1986-1987. DR. KOTTEK is associate professor, Harry Friedenwald Chair in the History of Medicine, Hebrew University-Hadassah School of Medicine, Jerusalem. Requests for reprints should be directed to Dr. Stern at Kiryat Hadassah, P.O. Box 12000, Jerusalem 91010, Israel.

ON THE STEAM BOAT, UNITED STATES
October 20, 1827

My fellow passengers are all strangers to me and the most of them are merchants from Connecticut having been to the great Emporiums to purchase goods. There is something peculiar in these Yankees, sober, Civil, Economical and generally temperate men who seem to be influenced by a single object, and that is to get money — When this stimulant is removed they relax from their actions into a kind of sub-existing state, from which they do not arouse until they are excited by motives of gain — Many of them are now stretched full length in the Cabin where they will remain snoring out their lazy breath until the boat arrives at the dock when they will be seen flying about like so many crazy Dutchmen on a Christmas day. Thus it is — habit, from the mere influence of education becomes a law, which distinguishes one individual from another as much as does talents, colour, or anything else — but I will speculate no longer.

—Anson Colman, M.D.

(Dr. Colman was a physician in early Rochester, New York. This excerpt is from a letter he wrote to his family while aboard ship which plied the coastal waters along the eastern seaboard of the United States. It is reprinted by courtesy of the Department of Special Collections, Rush Rhees Library, University of Rochester.)
Oddments in Dental History:
A Warning About Unskilled Extractionists
in 19th Century England

—Malvin E. Ring, D.D.S., M.L.S.
Rochester, New York

From the earliest days unskilled and unscrupulous individuals have preyed upon the desperate sufferers of toothache, an ailment described by one medieval writer as "... the worst pain that killeth not the patient." There were charlatans and mountebanks abounding in every community of Europe, ready to relieve the sufferer of his pain while relieving him of some of his money and frequently his long-term health. For these tooth-pullers cared little for the niceties of extraction, eager only to get past one patient and on to the next. And where the itinerant wasn't around when needed, the poor sufferer had recourse to the blacksmith who, with his great long farrier's pliers would manage to wreak destruction upon the aching jaw.

Reputable dentists of the last century were constantly striving to caution the public against the dangers of submitting to the ministrations of these charlatans and sought to educate people to the need to rely upon a trained practitioner. One of the most graphic descriptions of the dangers of falling into the hands of an untrained tooth-drawer (in this case a blacksmith) appeared in a small book which was primarily aimed at the lay public and issued in London in 1862. The author couldn't condemn the work of the tooth-drawer in this case strongly enough. Here, then, is an excerpt from Teeth, Their Natural History, With the Physiology of the Human Mouth in Regard to Artificial Teeth by Ephraim Mosely, Surgeon Dentist, London, Robert Hardwicke, Pub., 1862.

A baroness in her own right, being at her residence in a remote part of the country at a time when dentists were scarce, and medical men often disliked operating upon the teeth, was suddenly troubled with punishment from a molar in the upper jaw. She being a woman of strong character and determination, having been told that her blacksmith, residing in an adjoining village, was celebrated for fortune-telling, and tooth drawing, without hesitation sent for this country artist in horse shoes, and unraveling the mysteries of fate, to extract her tooth. This unkempt Mephistophilus, being ushered into the baroness's presence, pulled out a dirty handkerchief, with which to lap round the key tooth instrument, of his own forging. To this proceeding, her ladyship demurred, and as a condition of submission to her tormenter, offered her own cambric handkerchief which, from its fragrance and whiteness, sadly discomfitted this farrier artist. The man, nevertheless, with some difficulty and force, managed to extract the vicious molar.
This unfortunately was the commencement of mischief. Pain being only a temporary grievance, is easily and quickly removable; but fracture from force, leaves permanent and often irremediable mischief. The blacksmith's 'smithy' could forge horse shoes, and garden hoes, but turned out clumsily made key instruments for teeth. Thus his key was formed better to remove a granite boulder than a human tooth. This instrument having a heavy, powerful fulcrum, and equally clumsy lever to correspond, he necessarily fractured the baroness's alveolar process, and a portion of the jaw bone.

Her ladyship for the rest of her days, concealed in her mouth, the reminiscence of a blacksmith's skill in tooth drawing.

Let us above all things warn our readers against rash tooth drawing. Pain of the teeth, or of a tooth, we freely confess is a warning always to be regarded with suspicion, if not with fear, and apprehension. If under such circumstances, immediate application be made to a skilful and respectable dentist, relief will be prompt, and the source of mischief is easily removable.

SILVER JUBILEE CONFERENCE OF THE LINDSAY CLUB

To celebrate its 25th anniversary, the Lindsay Club, Great Britain's society for the history of dentistry, is holding a weekend conference on March 4-6, 1988 at the Viking Hotel, York, England. Named for the late Lilian Lindsay, one of Britain's greatest dental historians and translator into English of the immortal Fauchard's great work The Surgeon Dentist, the society is the British counterpart of the American Academy of the History of Dentistry.

The city of York, site of the conference, is a fascinating place for tourists. One of England's oldest cities, it boasts a newly rebuilt underground Viking village, a marvelous Castle Museum and one of the most complete railroad museums in the world with full scale trains of every era on display.

For further information please contact Miss Margaret A. Clennett, Secretary, The Lindsay Club, c/o British Dental Association, 64 Wimpole Street, London, WC1M 8AL, England.
Antique Book Collector’s Corner

Choicest “Receipts” from
The Compleat Servant-maid, London, 1685

—Max Geshwind, D.D.S.
Jamaica, New York

In 1685 the first book on dentistry in English was published in York, England. Its title was The Operator for the Teeth. Shewing How to preserve the Teeth and Gums from all the Accidents they are subject to. Its author was stated to be Charles Allen, Professor. The next year a second edition of the work appeared, printed in Dublin, followed by a third edition published in London in 1687.

In the same year that Allen’s book first came out a small work entitled The Compleat Servant-maid was published in London. The almost forgotten little work of 145 pages contained a supplement of pages numbered page 146 to page 178. And at the end was a list of works for sale by the printer, Thomas Passenger.

I have before me a disbound copy of this supplement, all of 34 pages, including a title page and booklist. The title page reads as follows:
A Supplement to the Compleat Servant-maid, containing the Choicest Receipts and rarest Secrets in Physick and Chirurgey, Fitted to the Capacity of the meanest House-keeper, and if put into Practice may prevent the frequent Expences and Charges, Which most Families are at upon Doctor-y and Chirurgery.

Printed for Thomas Passenger at the three Bibles
London Bridge 1685

This small work measures five and five-eighth inches by three and seven-eighth inches. It contains 97 recipes for all sorts of illnesses. They are quaintly labeled, such as one gotten from “The Duke’s Desk Newly Broken Up” and is a “Remedy against the Plague, for the Lord Mayor of London, by King Henry the Eighth.” This is followed by another for “A Medicine that was taught King Henry the Seventh by his Physician, against the Pestilence.” So much for the royal remedies for the plague.

Of interest to us are several recipes for the teeth and mouth that I would like to pass on.

On page 53, “For the Tooth-ach”:
Take Rosemary-wood, burn it to coals, not to ashes, beat it small, put it into new Linen Cloth, make it as big as a Walnut and hold it between your Teeth, it will kill all Worms, and keep the Teeth from all Pain. Prob-atim est. (Note: It is Proven.)

On page 156, “For the Canker in the Mouth.”
Take the juice of Plantain, Vinegar, and water of Roses, and wash the mouth therewith.

On page 165, “A Most Excellent Medicine to make Children breed Teeth easily.”
Take of pure Capon’s grease, very well clarified, the quantity of a nutmeg, and twice as much pure Honey, mingle and incorporate them well together, and three or four times a day anoint the Child’s Gums, when
they are Teething, and they will break flesh easily and prevent Torments, and Agues, and other griefs, which usually accompany their coming forth.

It is interesting to note the "homespun" nature of the quantity measurements, such as a handful, a sponful, the size of a nutmeg, a walnut or a bean. Here is one final sample on page 175, "An Excellent Medicine for a Stinking Breath."

Take two handfuls of Rosemary Flowers and Leaves, and boil them in as much White-wine as will something more than cover them, put into it a little Cinnamon, and Benjamin, beaten to powder, every Morning wash your Mouth with this, noon and night, and it will cure them.

The significance of this work, as I see it, is that in a book for "Servantmaids" there are recipes for toothache as well as many other ills. The usefulness of this, according to the title page's claims, is to save money for the employer by avoiding the fees charged by the physicians or surgeons of the day when they are consulted to treat ailments that can be treated by the servant by herself with the assistance of this handy treatment guide. Dental problems were most often treated at home, too, then, for "Operators for the Teeth" were not readily available.

DR. GESHWIND has been an assiduous collector of antique medical and dental books. He is retired from the active practice of dentistry. His address is 184-14 Midland Parkway, Jamaica, NY 11432. Requests for reprints should be made directly to the author.

WE BUY AND SELL
BACK FILES OF DENTAL JOURNALS AND BOOKS ON THE HISTORY OF DENTISTRY
BARTEL DENTAL BOOK COMPANY
Post Office Box 463
Brooklyn, NY 11207-3004
On the Occasion of the 150th Anniversary of the Birth of G. V. Black

—Aletha Kowitz, M.A.
Hannelore Loevy, C.D., M.S., Ph.D.
Chicago, Illinois

G. V. Black was an amazing scientist who put dentistry on a firm footing by his introduction of definite standards. Rightly considered to be the "Father of Modern Dentistry" he was nevertheless a warm human being and family man. The authors on the occasion of his sesqui-centennial sought out several of his descendants who helped paint this fine portrait of the man to whom dentistry owes so much.

Too often, we believe, Greene Vardiman Black, whose 150th birthday we are celebrating today (August 3, 1986), is thought of only as the venerable senior citizen with sparse white hair and a luxuriant white beard. We think of him as the dentist who designed cavity preparations which are still being used, postulated extension for prevention, and was the Dean of the Northwestern University Dental School and the "Father of American Dentistry". We forget that he was once a little boy, a teenager, and the father of a young family who had a heavy head of dark hair, a full beard, and a moustache long enough to tuck behind his ears. As a family man he was genuinely interested in his children and grandchildren. Letters of C.E. Black to his step-mother show how well liked G.V. was by his family, and how many hours of quality time he devoted to it at a time when it was not a common practice of fathers. Letters of several of the younger generation of the family attest to this. At a time when children were given little respect he is remembered as a person who held interesting and enlightening conversations with them, treated them as individuals, and never indulged in baby talk. As a clinician he was authoritative, but gentle, and displayed excellent dentist-patient rapport as was attested by a member of the first author's family who was his patient over an extended period of time. He was a real person, but we are in danger, this year in particular, of making him an icon.

G.V. Black was born on August 3, 1836, the fifth son of Mary and William Black. He was one of eight children (seven boys and one girl), and the first of those children to be born in Illinois. Older children in the family were born in Tennessee, but shortly before his birth the family moved to Scott County about 30 miles southwest of Springfield, Illinois, in west central Illinois where they stayed until he was about 8 years old. At that time they moved to a farm, Walnut Grove, about 45 miles northwest of Springfield in neighboring Cass County where the family still owned the land almost 100 years later. G.V. was an even-tempered, active person who loved to sing, who had a pleasant tenor voice, and who learned to play the clarinet, the double bass viol, the violin, and the flute. He also took part in and arranged musical programs and literary programs in the towns where he lived. After his 17th birthday he always signed his name, G.V., and so we may assume that he was not overly fond of the name, Greene.

G.V. was apparently a typical boy who hated farmwork and schools. He was known to weed a row in the field, then to stop to watch the birds or small animals, or to look at the flowers, and conveniently (for him) forget to go back to weeding. (His granddaughter, Clara Hubert, reports that he...
was called “that lazy little Greene” in the family. However, this does not mean that he did not like farm life. Even after he became a successful professor of dentistry, G.V. returned regularly to the family farm, and in fact, died at Walnut Grove. During his visits he spent considerable time and physical energy constructing dikes, and making other improvements on the farm. He was also known as an excellent shot with either a rifle or gun. In school, which he attended for a total of only 20 months in his lifetime, he was considered stupid and not likely to succeed. Just like his contemporary from across the Mississippi, Mark Twain, he apparently did not let school interfere with his education.

THE FAMILY DECIDES ON G.V.’S CAREER

The oldest son in the Black family, Thomas, studied medicine at the University of Louisville where he received an M.D. degree in 1871. Another son, James, studied at the University of Pittsburgh. Because G.V. was so useless on the home farm there was a family conference when he was 17 years old to determine what to do with him. The result was that he was sent to live with Thomas, and serve a preceptorship in medicine under him. G.V. was apparently a very lonely person when away from home, and his letters to his sister, Jennie, bear this out. He wrote extensively to Jennie who was a child of nine at the time of his preceptorship. While studying with Thomas, G.V. supported himself by working in the post office and the general store.

This first preceptorship was followed by a four-month preceptorship under Dr. J.C. Speer, a dentist of Mt. Sterling in Brown County (also in west-central Illinois). Tradition has it that Dr. Speer owned only one textbook which G.V. read over and over but the title has not been recorded. However, at this time there probably were no more than 20-25 dental books in the English language which Dr. Speer could have owned. Maybe it was this absence of reading material which prompted G.V. to say in 1907:

Read good books of any and every kind. Read the things you find most people reading. Make yourselves intelligent on all topics of common conversation. Look well to your own use of language. See that you use the English language correctly and well. Become an educated man.

The remainder of G.V.’s education was on a less formal basis with some of the study being done alone and some being done under the guidance of a person knowledgeable in a particular subject. One subject which he apparently never mastered, however, was spelling of the English language and so we find words like crystal spelled with an h after the c, suppurative is spelled with one p instead of two, and cartilage is spelled with an a instead of an i. This, from the man who taught himself German so that he could read Virchow’s work in the original, and who also taught himself French and Latin.

BLACK BEGINS PRACTICE IN WINCHESTER

After his dental preceptorship he moved to Winchester, Illinois, and started his practice when he was 22 years of age. Winchester (about 50 miles southwest of Springfield) was an important town of about 1200 residents, which had a gunsmith, a watchmaker, and professional persons in residence. It was about this time that G.V. married Jane Coughenar. Their marriage was a happy one and was blessed with the birth of a son, Horace. Horace died as an infant, and the only thing G.V. wrote to his parents was, “Our dear boy, Horace, is dead.” No further information was given and the implica-
tion is that the death was a very serious blow to this loving father. Fortunately, shortly after Horace' death another son, Carl Ellsworth, was born, but not too long after this Mrs. Black died of consumption, and G.V. took Carl to his parents to live.

When the Civil War broke out, William Black and some of his friends organized Company D, 129th Infantry, in the Union Army. G.V. and three of his brothers were mustered into service in 1862. G.V. was commissioned a corporal, but not in the medical corps. He served as a scout, but early in his tour of duty he injured a knee while climbing over a fence. As a result he spent about six months in a military hospital in Louisville. He was not able to continue his military service and was given a disability discharge. While in the hospital he taught himself to work with his left hand and was able thereafter to use either hand with almost the same degree of dexterity.

AFTER RETURNING FROM MILITARY, SETTLES IN JACKSONVILLE

After his return from service, G.V. set up practice in Jacksonville, Illinois, bought a house, married Elizabeth Davenport, and in due time became the father of three more children, Clara, Arthur D., and Margaret. This house was located centrally (Fig. 1) and his dental office was on the main central square. Neither of the structures has survived the “modernization efforts” of the citizens of Jacksonville. G.V. is buried there as are most of his children and many of his descendants. G.V. was a family man, but also a scientist, and while the family spent one hour a day together, singing, reading, or in other leisure types of activity, when the alarm clock went off after an hour, he went into his office, and was not disturbed again except in an emergency. His granddaughter, Clara, tells the story that he was a “night hawk” and suffered from insomnia. She too is a “night hawk”, and when she was an infant she refused to settle down one evening. The story was told to her that Grandpa told Clara’s mother to place the baby in a high chair with some toys and to leave her in his office for him to care for. The story also reported that Clara and Grandpa both were content for the remainder of the night.

Clara Hubert also tells the story that Grandpa visited her family in Duluth, and he enjoyed tramping through the woods and other country activities. She visited Grandma and Grandpa in Chicago at their apartment on the South Side, at 4465 Oakenwald Avenue, whenever possible. (This building has been demolished along with many in the area in the course of urban renewal. The site is a mass of rubble.) Grandpa would take her along when he went to the corner drugstore on 43rd Street to purchase the big cigars he habitually smoked. She has not yet figured out whether Grandpa purchased the cigars he really wanted but he certainly purchased the ones with the
Fig. 2. Monument dedicated August 3, 1986 on the occasion of G. V. Black's 150th birthday. It stands in the central square of Jacksonville. On the left is his great-granddaughter, Katherine Hubert Malott and beside her is G. V. Black's granddaughter, Clara Hubert.

cigar bands she needed for her collection. Clara also reports that Grandpa liked to play chess, and was known to play with friends who were in their homes, using the telephone to report moves.

G.V. BLACK'S ROLE AS A PATHOLOGIST

In the 1850s several important events occurred. Darwin's Origin of the Species was published in 1853, and Rudolf Virchow's Cellular Pathology was published in 1858. These publications were inspirations to G.V., especially since they were in line with work which he was already undertaking. A German immigrant physician whose name we have not been able to discover brought the first microscope to Cass County. G.V. in short order was working with him using the microscope, making accessories for it, and finally arranging to buy it (Fig. 4). His mechanical abilities allowed him to make adjustments to the microscope and accessories for it which permitted the study of many kinds of tissues. Early in his histopathological work he realized that it was necessary to study both normal and pathological tissues, and together with Dr. David Prince, a prominent surgeon in neighboring Morgan County, Illinois, was able to interpret tissue changes in disease conditions. Because so much of the literature of histology and pathology was written in German, G.V. quickly learned the language in order to read the background papers needed for his research.

In one of his lectures of 1907-1908, when he was Dean at Northwestern, he said:

Anatomy, histology and chemistry are laboratory studies contributing particularly to the understanding of physiology. The secretions of the body are from glands, the forms, locations, ducts, and connections of which are studied in general anatomy, the cellular elements and structure of

132
which are studied in histology, the chemical nature of the secretions themselves are determined by chemistry, and the functions of all these in their completeness constitutes the subject of physiology. Therefore all of these are undertaken and carried forward together the one supporting and explaining the other. You should look upon these as practically one study; that which gives you a knowledge of the human body and its functions in their completeness which constitutes the ground work of medicine in all of its specialties.

Tissues were sectioned using a home-made microtome which employed a razor blade for the knife edge. He experimented with various stains, one of which was probably India ink and one carmine. He also tried double stains on many tissue samples. Black prepared thousands of slides over a long period of time, and the Bureau of Library Services of the American Dental Association was fortunate enough to receive four boxes of them dated 1879 and 1880 in a gift of antique dental instruments from the Northwestern University Dental School. The slides are uneven in thickness, and vary slightly in size.

The 88 slides which are in the boxes we were given are each numbered (some are even renumbered) and labelled in Dr. Black’s handwriting, and two of the boxes have indexes on the cover. Sections vary from specimens taken from a kitten to human fetal tissue. Most slides are in perfect condition, and amazingly the dyes still display color after one hundred years. One box is labelled Brain and Spinal Cord; another, Tumors. Studies of Neoplasms, Sections of Dental Pulp, and Spinal Cord (both cross and longitudinal sections) and Medulla Oblongata (from calf, kitten, and human samples) are other titles in the...
series. Slides in the box on tumors include sections of the axilla, and cancer of the breast. Sections in the box on the growth of bone include synovial membrane, human fetus parietal bone, and the rib of the kitten stained variously with carmine, and a double stain. Dental pulp sections are of both normal and inflamed tissue and demonstrate hypertrophy, nodular degeneration, hyperaemia, and suppuration.

BLACK INITIATES DENTAL LICENSURE IN ILLINOIS

Even though he had already limited his practice to dentistry, by 1877 G.V. had taken and passed the licensing examination for physicians in the State of Illinois. With his brother, Thomas, he then prepared the first Dentist Licensure Act of Illinois in 1881, and was appointed to the first dental examining committee, and was elected President of the committee, after which he issued to himself a license to practice dentistry in Illinois.

HE ENTERS THE FIELD OF DENTAL EDUCATION

In 1870 he started his formal teaching career at Missouri Dental College in St. Louis as a lecturer in histology and microscopy, and a year later added pathology and operative dentistry to his list of courses. From this he advanced to teaching at the Chicago Dental Infirmary in 1883, the Chicago College of Dental Surgery in 1885, the University of Iowa in 1890, to Northwestern University Dental School in 1891, and finally to the office of Dean of the Dental School at Northwestern in 1897. However, even as Dean he continued to teach and practice in the dental clinics and added the work of Dean to that of professor, and not vice versa. His philosophy of the dental professional stance is summed up in this quotation from his Dean's Lectures of 1907-1908:

The state pays some portion of the expenses but generally the professional schools belonging to universities are required to meet their own outlay for both their equipment and running expenses. Therefore to maintain a good dental school requires that a comparatively high tuition be charged.

A search in the Northwestern University Dental School Circular of Information for 1895 and 1900 shows that costs for a year were: $5.00 Matriculation Fee, $100 Annual Fee, and $5.00 Breakage Deposit for a total annual tuition of $110. Comparable fees for a term of undergraduate education at Northwestern for 1895 were: $15 Tuition and $8 Incidental for a total of $23 a term or $69 a year. By 1900 an additional Laboratory Fee of unspecified amount was to be paid. By way of comparison the price of a

Fig. 4. This painting of G. V. Black beside his beloved microscope hangs in the headquarters of the Illinois State Dental Society in Springfield.
pound of butter was 13¢ in 1895, 14¢ in 1900, and $2.19 today, a dozen eggs was 20¢ in 1895, 21¢ in 1900, and 89¢ today, and five pounds of sugar were 26¢ in 1895, 30¢ in 1900, and $1.89 today.

G.V. Black also said:

Professional education is in this way placed in a different class from other forms of education and must remain so until liberal minded men shall place endowments for their use. Yet professional education is of the highest order of educational effort and professional men have the highest order of responsibility among men. A general education contributes especially to the maintenance (sic) of the material things of civilization, as food, clothing, shelter, and the accessories belonging in this general category, or in other words, to the commercial business of the nation.  

G.V. Black kept case records as early as January 1, 1860 when he started the formal practice of dentistry, and in these records he used abbreviations of his own devising. He recorded charges made for services rendered, but when he extracted a tooth he kept no record of which tooth was extracted, nor did he note whether a restoration was a class I or a class II. His 1860 records show that he extracted 175 teeth at 50¢ each, filled 216 teeth at $1.00 each, made six partial dentures at $15 each, cleaned teeth, administered ether to some patients, and grossed $1213 with $488 in expenses for a net of $727.

The man who did so much to improve the instruments and equipment used by dentists, whose work on dental amalgam still has relevance today, whose work in histology and pathology brought him an appointment as Professor of Histology and Pathology at the University of Iowa Dental School and Professor and Dean at Northwestern University Dental School, who was instrumental in starting and keeping going many cultural groups and organizations, was also the man who owned the first bicycle in central Illinois. It was constructed from old buggy wheels with iron tires but had a moveable seat. He was the man who invented a rat trap which is known to have killed 12 rats in one night by means of its repeating mechanism. He was also the man who made doll house accessories for his small granddaughter. This man is always portrayed as serious, formally dressed, and somewhat forbidding. He was not He was a fisherman and a sailor and had many friends. A nephew reported that Uncle Greene was not a good driver (of a horse and buggy) and that the horse really drove the buggy. The nephew also reported that Uncle Greene would talk and the buggy sometimes ended up on the sidewalk. Fortunately for everyone, by the time the horseless carriage became popular G.V.'s daughter, Clara, was able to provide chauffeur service. G.V. Black inspired his sons, one becoming a physician, the other a dentist, a teacher, and Dean at
Northwestern Dental School. He must have had a sense of humor. He had to be what now is known as a “real” person. It is this person to whom we wish a “Happy Birthday”.

REFERENCES

7. Black, G. V. Personal notebooks. Various years. Made available to the authors by Miss Minnie Orfanos, Librarian, Northwestern University Dental School.
8. Northwestern University Dental School Circular of Information, 1895, 1900.

ADDITIONAL SOURCES CONSULTED

Black, C. E. “A Son Recalls His Father” A letter to Mrs. G. V. Black and Miss Clara Black, August 31, 1920.
Archives, Northwestern University.

(This paper was presented at the 35th Annual Meeting of the American Academy of the History of Dentistry, Miami Beach, Florida, October 17, 1986)

MISS KOWITZ, a past-president of the American Academy of the History of Dentistry, is the Director of the Bureau of Library Services, American Dental Association. DR. LOEVY is professor of clinical pediatric dentistry, Department of Pediatric Dentistry, College of Dentistry, University of Illinois at Chicago. Address requests for reprints to Miss Kowitz at the American Dental Association, 211 East Chicago Avenue, Chicago, IL 60611.
What Is It?

The fascinating item for this issue is made of ivory and is approximately two inches in diameter. The center portion is raised and is studded with holes. On the periphery of this raised portion are scratch marks which were made during the item’s use.

This specimen was made in England around 1820 or 1830. How many of you know what its purpose was?

Now for the item featured in the last issue. We have to assume that no one knew what it was because we received no letters identifying it.

The hand-blown glass tube was part of the armamentarium of every physician and dentist. It was a leech tube, used for drawing out blood from inflamed areas by means of a blood-sucking leech. The leech was placed head-first into the larger end. Since the animal was too large to pass through the tube’s smaller end’s opening, it would stick its mouth out through the opening and attach itself to the body part where it was placed. It is to be assumed that a cork or something similar was placed in the larger opening after the leech was placed in the tube. A thread was frequently tied to the leech’s tail in order to withdraw it from the tube.

Leeching is thoroughly discussed in the book Bloodletting Instruments by Audrey Davis and Toby Appel:

The major advantage of the leech...was that (it) could be employed on almost any part of the anatomy, including around the eyes, in the mouth, the anus and the vagina. In fact, leeching the internal membranes enjoyed quite a vogue in the early nineteenth century...The leech was usually allowed to drop off of its own accord when it had satiated itself, which took about an hour...Once used, leeches could not be reused for several months unless they were made to disgorge their meal by dropping them in salt water or weak vinegar.

The accompanying drawing is taken from the book The Principles and Practice of Modern Surgery by Robert Druitt, and published in Philadelphia in 1847. It is described, in the caption, as being used to draw blood from an inflamed area of the meatus of the ear.
Honore Victorin Daumier (1808-1879) — French

The Good Parisians - No. 4 Lithograph probably published in Le Charivari, circa 1852

Caption: It's really very annoying for young people like us to be forced to use these little accessories. ...We must ask Monsieur Flourens how to avoid them.

Of the entire school of French caricaturists that arrived on the scene during the nineteenth century, none was more talented and productive than Daumier. He was a draughtsman of uncomparable skill and a keen observer of the political and social milieu in which he lived. During the course of a remarkably prolific career he produced some 4000 lithographs and drawings, most of which appeared in the French publications La Caricature and Le Charivari. This gigantic oeuvre of graphic work provides a lasting documentation of the tumultuous era in which Daumier lived and a kaleidoscopic view of Parisian life during that time. This sketch is one of many examples of Daumier's uncanny ability to lampoon the excesses of his day. False teeth (Rateliers) were widely promoted and used during this epoque, but rarely did the results live up to the claims made.

Clinical Professor of Dentistry
Columbia University School of Dental and Oral Surgery
Dr. Moskow is the author of the book Art and the Dentist.
Alex Peck, Antique Scientifica, offers an exceedingly fine presentation dental chest put together by Kern of Philadelphia. The fitted rosewood case holds some 130 instruments, many with handles of mother-of-pearl — some set with gold-mounted jewels — coral, ivory and ebony. A gold plaque attached to the lid is inscribed

**Lloyd Quinby**

It is believed that the set was given to Dr. Quinby in 1861 as a wedding present from Fanny Ringgold, his bride. Quinby was a “druggist” during the Civil War, serving with the 20th Texas Volunteers, C.S.A. However, he had been graduated from the Baltimore College of Dental Surgery and practiced in Houston, Texas.

Besides many other dental and medical antiques in stock, Alex Peck is now carrying Elisabeth Bennion’s new book *Antique Dental Instruments*, $40.00 postpaid.
SOME FURTHER NOTES ON THE DISCOVERY OF LOCAL ANESTHESIA

In the “Classics in Dental History” section of the Bulletin for October, 1986, Dr. Herschfeld recounts the steps that eventually led to the adoption of local anesthesia. It was pioneered by Carl Koller but many other investigators’ contributions ultimately added up to success.

Twenty years after the isolation of the alkaloid cocaine from coca leaves by Nieman in 1860, the German physiologist, von Anrep, working in Wurzburg, injected a weak solution of cocaine under the skin of his arm. He then observed “…insensitivity to pretty strong needle punctures at the site.” He published this observation in the Archives of Physiology, 21:38-77, 1880 (Bonn) but it appears to have been overlooked and forgotten.

Carl Koller’s method of achieving anesthesia of the eye and mucous membranes by the droplet method was demonstrated by him on September 15, 1884 in Heidelberg. Only two months after that the surgeon, William S. Halsted, made his first injections with the newly-found drug.

I always wondered at the fact that Halstead could have made such an experiment such a short time after Koller’s initial demonstration, considering that communication was a lot slower 100 years ago than it is today. Therefore, I decided to look into the life and career of the young Halstead.

For two years Halstead had traveled about Europe, especially Germany, visiting and studying in the various surgical clinics. For some months he was an assistant to the noted surgeon, E. von Bergmann — who later introduced in Berlin his system of antiseptic surgery.

Halstead’s studies took place in the same town — Wurzburg — where von Anrep had published his researches, and it was during the same year — 1880. It is therefore most likely that Halstead heard in this small university of those investigations. And it is also probable that he read the accounts of them in the current literature, for Halstead was able to read German. And then, when he received word of Koller’s demonstration, and remembering von Anrep’s use of a hypodermic syringe on himself, he immediately put it into practice.

This very rare photograph of Carl Koller (left) and Sigmund Freud was taken during their early years in Vienna. It was graciously loaned to us by Dr. Hoffmann-Axthelm.
History records that Halstead (as did many other investigators) became addicted to the drug by self-experimentation. However, he was able to liberate himself from this awful habit by an energetic withdrawal cure. He went on to become chief surgeon of the Johns Hopkins Hospital in Baltimore where he founded an outstanding school of surgery. In addition, it was there that Halstead introduced the use of the rubber glove into surgical procedures.

—Prof. Dr. Walter Hoffmann-Axthelm
Freiburg, West Germany

(Editor's note: Dr. Hoffmann-Axthelm, one of the world's greatest authorities on dental history, is also an Honorary Member of the American Academy of the History of Dentistry. He is the author of the acclaimed book Die Geschichte der Zahnheilkunde which also exists in an English language edition under the title History of Dentistry, both published by Quintessence, International.)

MORE SUPPORT FOR A STAMP HONORING HORACE WELLS

The year 1994 will mark 150 years since Dr. Horace Wells, the dentist of Hartford, Connecticut, first demonstrated the blessings of anesthesia. To mark that occasion, a concerted campaign has been carried on for some time now to urge the U.S. Postal Service to issue a postage stamp honoring one of mankind's greatest beneactors. It has been a struggle against great odds with the committee in charge of selecting persons to be honored on stamps opposed to issuing a stamp dedicated to Horace Wells. However, because of a great deal of support for the idea coming from many individuals and organizations both in this country and abroad, the committee has agreed to take a second look at the idea. At the forefront of the fight to get the stamp has been Dr. Leonard Menczer of Wells' home town, Hartford. Dr. Menczer, who is curator of the Medical-Dental Historical Museum in that city, has been waging a strong campaign and has received wide encouragement. But most important are the letters which, by his urging, have been sent to:

The Stamp Advisory Committee
U. S. Postal Service
Customer Services Department
475 L'Enfant Plaza, S.W.
Washington, D.C. 20260-6300

We earnestly solicit the support of the readers of the Bulletin and urge that letters of support of a Wells commemorative stamp be sent to the committee. Remember, in its entire history only one stamp concerning dentistry was ever issued by the United States and that was 28 years ago!

A big boost for the campaign has been the following resolution adopted by the City of Hartford and signed by His Honor, Mayor Thirman L. Milner, on May 26, 1987. The resolution follows:

COURT OF COMMON COUNCIL
HARTFORD, CONNECTICUT
RESOLUTION

WHEREAS, in Hartford, Connecticut, on December 11, 1844, Dr. Horace Wells, a member of the dental profession, having concluded that nitrous oxide gas breathed into the lungs would induce general harmless insensibility to pain, voluntarily tested this belief by inhaling in the presence of colleagues, enough of that gas to cause temporary unconsciousness, whereupon by previous agreement, Dr. Riggs by accustomed method extracted a molar tooth from the mouth
of Dr. Wells, who throughout the operation felt none of the usual sensations of pain, recovering completely from the effects of the anesthetic soon after the tooth had been removed; and

WHEREAS, Dr. Wells thereafter gave to patients in his private practice, the benefits of his method of inducing general anesthesia and also made freely and widely known, this simple yet extraordinary means of pain prevention, thereby favoring universal extension of its beneficence and also facilitating improvement of its technique by numerous further tests, thus becoming one of the world’s greatest benefactors; and

WHEREAS, The one hundred and fiftieth anniversary of the first steps in the development of present-day methods of anesthesia by Dr. Horace Wells will be celebrated in 1994 to express the abiding gratitude of mankind for the priceless blessing that Dr. Wells’ endeavors initiated; now, therefore, be it

RESOLVED, That the Mayor and Court of Common Council of the City of Hartford, call on the Citizens Stamp Advisory Committee of the United States Postal Service to favorably consider issuing a stamp commemorating Horace Wells in 1994, on the one hundred and fiftieth anniversary of his discovery of general anesthesia; and be it further

RESOLVED, That the Town Clerk cause a copy of this resolution to be sent to the Postmaster General of the United States Postal Service.

ADOPTED BY THE COURT OF COMMON COUNCIL
May 26, 1987 Thirman L. Milner, Mayor
Max Geshwind for help in tracking down an elusive citation of a book which carried some reference to dental treatment in the late Middle Ages.

The following communication has been received from Dr. R.A. Cohen of Leamington Spa, England. Dr. Cohen, who is an Honorary Member of the American Academy of the History of Dentistry, is Britain's leading dental historian and an outstanding authority on early dental literature.

The citation in Strongen is Gradibus, Matheus de: *De Anatomia dentium* ... Papiae [i.e. Pavia, N. Italy] 1497, and as Dr. Geshwind stated, the work is to be found according to Stromgren in the Bibliotheca du Museum d'Histoire Naturelle, Paris, and was not verified by Madame Stromgren. It was presumably copied by her from a previous bibliography.

I think it is most probable that this title does not exist as a separate book, but is in fact a chapter or section in a book with another title.

A work by de Gradibus was published in 1497 entitled *Practicae, pars I et II, vel commentarius textualis cum ampliationibus in nonum Rhazis ad Almansoren cum textu*, Papiae; this was re-published in Lyon 1527 and in Venice 1521 and 1560, and it may be that the Paris library has a copy of this work and would be able to inform Dr. Geshwind whether it contains a chapter, section or "book" entitled *De Anatomia dentium*.

Johannes Matthias de Ferrariis, commonly known as de Gradibus, is believed to have died in 1460. He published a number of books and was a distinguished doctor.

The information on de Gradibus is derived from two rare medical bibliographies in my library:
1. Lindenius renovatus ... G. A. Mercklinus, Nuremberg, 1686.
2. Bibliotheca chirurgica ... S.H. de Vigiliis von Creutzenfeld, Vienna, 1781.

Yours faithfully,


THE ORIGINATOR OF THE D-M-F INDEX

Your editor has received a communication from Dr. William J. Jasper of Raleigh, North Carolina, about an error in the book *Dentistry — An Illustrated History*. As author of the book, I would like to set the record straight.

Dr. Jasper, who holds a Master of Public Health degree as well as a D.D.S., served for many years with the United States Navy before embarking upon his public health career. He is without doubt an authority on public health procedures as they pertain to dentistry.

He points out that it was Dr. Henry Klein, late of the United States Public Health Service, who was the true creator of the D-M-F (decayed, missing, filled) index, a tool which was later put into use by Dr. H. Trendley Dean in evaluating the fluoride experiments conducted by the USPHS in Kingston-Newburgh, New York, and in Grand Rapids, Michigan. In my book I incorrectly credited Dr. Dean with creation of this most important index that has allowed investigators to truly measure their success.

A NEW MUSEUM IS BORN

Events at the giant National Institutes of Health in Bethesda, MD, are always moving, some slower than others, but always moving. New things are continually appearing, such as new laboratories, new offices, floors, entire buildings, even a new road. But now something quite different has appeared.
There is to be a new museum, known officially as the “DeWitt Stetten Jr. Museum of Medical Research”. It will collect and exhibit biomedical research instruments and other artifacts related to the history of the National Institutes of Health. While complementing the function of the Visitor Information Center at the Clinical Center, the museum exhibits will explain how medical research instruments work and interpret their significance to the visiting public. For the National Institutes of Health Centennial, several of the exhibits will be mounted for the formal ceremony.

Over the past years, Dr. Stetten has collected classical medical research instruments that were in danger of being lost or discarded. These instruments and other National Institutes of Health memorabilia form the core of the museum’s collection.

This museum represents the heritage of the National Institutes of Health. Like its publications, it is a part of the record of its accomplishments. However, these instruments are much more enduring. Success of the project, however, will depend on ideas for exhibits as well as additions to the collection that have been or will be contributed by National Institutes of Health staff members.

Several institutes have already made a significant contribution to the museum. The National Institute of Dental Research has contributed “The Fluoride Story” with continued updating. Exhibits such as “Rocky Mountain Spotted Fever”, “Cell Culture”, “Heart Lung Machine” and “Windows into the Brain” are continually being updated. They are absolutely fascinating presentations.

Antique medical instrument exhibits are presently located in the lobby of the Ambulatory Care Research Facility Building (Building-10). Objects in this exhibit are on loan to the National Institutes of Health from the personal collection of Doctor Terry Hambrecht of the National Institute of Neurological and Communicative Disorders and Stroke. He became interested in historical devices, especially those in electrotherapy, while tracing the origin and development of ideas behind modern neural stimulating devices used in diagnosing and treating the neurologically handicapped.

Dr. Victoria A. Harden has been named the first Curator of the Museum. Chairman of the Museum Advisory Committee is Dr. DeWitt Stetten Jr; eight other scientists complete the committee.

While dentistry is now well-represented, efforts are in progress to develop a close relationship with other dental museums presently actively functioning.

Further information may be obtained from the undersigned.

Lloyd E. Church, D.D.S., Ph.D.
Book Review Editor
Bulletin of the History of Dentistry
4833 Cordell Avenue, #322
Bethesda, MD 20814
To the Editor:

I was very pleased with the way the news from Western Australia was presented in the last issue of the Bulletin. Last year was quite a year for us!

Progress is slow on our museum, but I think help is at hand. I'm getting a bit slower as I get older; the clock is a bit relentless but we cannot do much about it.

Kindest regards,

Dr. R. F. Stockwell
Claremont
Western Australia

---

To the Editor:

Many thanks for the complimentary issue of the Bulletin. It is both interesting and valuable! Herewith is my check and membership application.

I noted the picture of the University of Wurzburg in the article on Otto Walkhoff. I was stationed near there once when I was with the Dental Corps of the U.S. Air Force. Dr. Roentgen worked there, too, you know.

Sincerely,

William J. DuBose, D.M.D.
Montgomery, AL

---

To the Editor:

I have recently been made aware of your excellent journal and I am interested in submitting an article for consideration for publication. Please advise me as to the proper protocol to be followed.

Sincerely,

David J. Reisberg, D.D.S., Director
Maxillo-facial Prosthetics Center
University of Illinois College of Medicine
Chicago, IL

(Editor's note: "Instructions to authors" appears inside the front cover of each issue of the Bulletin. Any further information may be obtained by writing the Editor at the address there listed.)
To the Editor:

Your publication is being considered for subscription. Before this is done, however, we would appreciate receiving a recent issue which will be used for evaluation purposes.

Sincerely,
Mabeth Austin, Senior library assistant
Bio-Medical Library
University of Minnesota
Minneapolis, MN

To the Editor:

I have read in the latest issue of the Academy Newsletter a reference to a paper, published in the August, 1986, issue of TIC magazine, entitled: "Dentistry — An Illustrated History: Move Over Picasso!"

I am interested in reading it and kindly request information where I can secure a copy of this paper.

Sincerely,
Dr. Jose A. Canut
Grabador, Valencia
Spain

To the Editor:

On the occasion of collecting bibliographical material for the preparation of a manuscript “The Historical Development of Periodontology” I was very excited to discover your excellent book Dentistry — An Illustrated History, and to find the references to periodontology which you made in the book, but about which I already knew.

I would, in connection with this problem, be very indebted to you if you would let me know if in the Bulletin of the History of Dentistry (from 1953 on) were published any contributions relating to the development of periodontology.

I would also like to send you a reprint of a publication I wrote on the occasion of the hundredth anniversary of the Dental School of Geneva. It appears that this is the oldest “state” dental school in the world. The pamphlet is written in French which is our teaching language.

I remain, very sincerely yours,
A. J. Held, M.D., D.M.D.
Professor emeritus
University of Geneva
Switzerland

To the Editor:

In the April 1987 issue of the Bulletin you carried a story in the “Notes & Queries” section about the dedication of the statue in Paris of Horace Wells, and the accompanying reception at the American embassy.

I am sorry to say that the occasion was not concerned with Horace Wells — although I hope that some day that will be so — but with the centennial of the Statue of Liberty and at the same time to celebrate the entering of the 100th year of the Paris edition of the Herald Tribune. For the latter celebration a facsimile reproduction of the newspaper's first issue was distributed to the guests, and it was from this that the excerpt was taken, which you printed, which pertained to “American” dentists in Paris.

Most sincerely,
Jacques Foure
Neuilly, France
This newest addition to the bibliographical literature of dental history (as well as other fields of medical history) is very welcome. At last we have a source book which lists virtually all the trade catalogs and other publications of manufacturers of medical, dental, surgical and other professional instruments and supplies, not only in the United States and Great Britain but a number of other countries as well.

Trade catalogs can give one a good idea of the practice of a particular profession at a particular time. As the authors state in their introduction:

One of the purposes of this bibliography is to inspire readers to look at trade literature to understand those aspects of the practice of medicine which involved apparatuses, tools, aids, etc. Trade literature provides another source for the historian to investigate the type of information physicians relied on throughout their careers and, in many instances, to which they contributed and responded. Manufacturers who advertised over several decades demonstrated the techniques which were effective in getting physicians to buy and prescribe their products. The descriptions and explanations found in the medical trade literature provide examples of the type of language and arguments that were successful in selling specific medical aids to physicians. For physicians, especially those in practice in small towns not located near teaching centers, medical trade literature was a primary source of information about changes in treatment developed after they graduated from medical school.

Of course, the word "dentist" may be substituted here for the word "physician" since the same dynamics operated in the field of dentistry. A tremendous amount of new and useful information was available to the dentist of the past as he pursued a new catalog or pamphlet. Similarly, a tremendous amount of information is available to the scholar of dental history of today as he pursues these very same catalogs.

The principal author, Dr. Audrey B. Davis, a long-time member of the
American Academy of the History of Dentistry, is a highly respected scholar in the history of the health sciences. Dr. Davis, who is Curator of Medical Sciences of the Smithsonian Institution, has had numerous publications relating to instruments and instrumentation. Her book Medicine and its Technology: An Introduction to the History of Medical Instrumentation is a classic in its field and the chapter she wrote on dental craftsmen in 19th Century America for the book Nineteenth-Century Scientific Instruments and their Makers, published by the National Museum for the History of Science of the Netherlands, is one of the most complete descriptions of dental instrumentation of the last century yet published. Her co-author, Mark Dreyfuss, is Museum Specialist in Dentistry at the Museum of American History, Smithsonian Institution, Washington, DC.

The introduction, which occupies the book's first thirty pages, is a fine history of not only the publishing field as regards professional groups, but is also a short but good history of many of the leading manufacturing firms. Thus there are fine pieces about the S.S. White Company, the Buffalo Dental Manufacturing Company and many other well-known producers of fine instruments and supplies which enabled American dentists to take the lead in world dentistry. Thus, this reviewer found out that the Buffalo Dental Manufacturing Company was first organized in 1867 to produce and market a new gold-foil plugger invented by one of the company's founders, Dr. George B. Snow. (Dr. Snow, some 25 years later, would be one of the movers for the establishment of a dental school associated with the University of Buffalo.) More than pluggers were sold by the company, however, for it soon became one of the most respected manufacturers of a whole line of dental instruments that carried the company's name throughout the world. In time the company was sold to the Novocol Company of Brooklyn which still maintains the original company name for many of the products it makes and sells. Of interest is the fact that a grandson of one of the original founders, Theodore M. Lewis, is president of a retail dental supply business in Buffalo and is an active member of the American Academy of the History of Dentistry and an avid history buff.

There are several different listings of trade catalogs and other sundry publications: by name of the company (after which in capsule form is given the history of the company, when it was founded, its various addresses, etc.); by name of the institution, library or individual, holding that publication in its collection; and by an exhaustive subject index which gives access to all of the material contained in the book by subject matter. Thus under the heading "Amalgam, dental" are listed reference numbers to 5 different trade publications which dealt with amalgam, its composition and its method of handling.

The authors are to be complimented in bringing to us this excellently researched handbook. It deserves a place in every research library for it puts at the fingertips of the student of the history of the healing arts a wealth of information which heretofore was scattered and hard to come by. In addition, the book is well printed on good stock and hard-bound, easy to read and hold.

The book may be most easily ordered from The Printers' Devil, One Claremont Court, Arlington, MA 02174. Please enclose $2.00 for postage and handling.

—Reviewed by Malvin E. Ring, D.D.S.
Rochester, New York

This is an unusual and interesting treatment of the changes and advancements made in hospitals and health care in the last 50 years. About 40 persons who were important to the health care field were interviewed for oral histories. Instead of publishing each as a separate entity which would be the more usual process, the interviews were integrated into a cohesive whole around specific questions and areas of health care. With skillful editing and the use of connecting text, the oral histories were interwoven and the result is a wide-ranging discussion of the developments of the 1930s to 1980s from the viewpoint of the persons who were leaders in the field.

The book starts with a chronology of health care in the United States from 1899 when the Association of Hospital Superintendents (the forerunner of the American Hospital Association) was established. The chronology continues through 1965 when Medicare and Medicaid became a part of the Social Security system. The four parts of the book are: Cornerstones; Blue Cross; Emergence of a Profession; and A Look Backward. The first section contains what are considered the foundations of today's hospital system; the work of the Committee on the Costs of Medical Care; the Hospital Survey and Construction Act, better known as the Hill-Burton Act; and Medicare and Medicaid. Part II is a discussion of the establishment and workings of the Blue Cross system and its effects on the delivery of hospital care. Part III presents the history of the American Hospital Association, and, more especially, the evolution of hospital administration as a profession. Part IV is an overview of hospitals, health care, and the political philosophy of the last five decades. It also points the reader forward to potentialities for the decades to come. Eleven appendices include relevant documents or excerpts of documents as clarifying and supportive material.

The book is recommended for anyone wanting a good understanding of hospitals and health care and how they came to be what they are in the United States in the 1980s. The text reads easily, even though there is much information presented and many thoughts are provoked. Finally a long bibliography is provided for the person who wants or needs even more information on the United States health system.

Reviewed by Aletha A. Kowitz, M.A.
Director, Bureau of Library Services
American Dental Association


The history of professional dentistry offers nothing more admirable than the conduct of the International Circuit Courses before the eyes of the world. Its aims were well summed up by Dr. I. Kenneth Adisman, ICC president and director, when he said

To further better health among the peoples of the world and promote dentistry's highest professional standards . . . to develop the International Circuit Courses into one of the most impressive, imaginative and gratifying single educational projects ever to be associated with the dental profession. These are our goals.
Founded in 1962 by the late Dr. Homer Cree Vaughan, a distinguished New York City dentist and affiliated with the American Prosthodontic Society, this very unique venture in international academia captured the imagination of the dental profession, the public and even the President of the United States, Gerald R. Ford. It has promoted the highest prosthodontic standards as a health service for people in foreign lands, regardless of race, creed or color.

How this idea, detailed planning and execution came about is now recorded by a world-renowned author, Dr. Edgar S. Bacon, a longtime member of the American Academy of the History of Dentistry. Indeed, he has recorded an impressive and remarkable narrative of a fascinating history of American dental leaders in their travels to distant lands, disseminating their knowledge and experience to appreciative and eager audiences. Their wives also contributed their own experiences and observations of the cultures and customs of the many countries visited.

Dr. Bacon has placed the history of this remarkable organization in proper order, from the first seed to the enormous tree that now exists, and he has left nothing out. The first committees, first lectures, first correspondence and the first reactions are all recorded.

This is an excellent book to read, made so by the professional efforts of Dr. Bacon. For those in the dental profession, this book is a memento to the heights that a group of dedicated individuals can attain. They are an inspiration and a credit to all of us. Obtaining a copy should be every dentist’s obligation.

—Reviewed by Lloyd E. Church, D.D.S., Ph.D.
Associate Clinical Professor of Surgery
George Washington University Medical Center
Washington, D.C.


In 1830 three branches of the medical profession were recognized in England: the physicians, the surgeons and the apothecaries. These three groups had different education and status in the English society and different organizations were involved in granting licenses to practice. Licenses were granted by the Royal College of Physicians, the Royal College of Surgeons and the Worshipful Society of Apothecaries.

At that time, physicians were traditionally held to be scholars and gentlemen and practiced internal medicine. Their number was small (179 in 1800) but they had great prestige and political influence. By the first half of the nineteenth century, however, the practice of medicine was changing since surgeons were not only practicing surgery but also general medicine. Thus, by the middle of the nineteenth century, a process of division of the medical profession into consultants and general practitioners was starting to take place. Some of these changes also led to the formation of a new group, the British Medical Association, in 1832.

How this process of traditional professional structure was increasingly changed and how new professional divisions came to be are discussed in great detail in this book.

The main focus is the analysis of the interrelationships between the
changes in the medical profession in nineteenth century England and the developing middle class which demanded medical attention that was affordable.

The book is divided into 3 major portions; each further divided into chapters. The first part analyzes the medical profession at the beginning of the nineteenth century. The second part describes the bitter disputes within the profession associated with the campaign for medical reform which eventually led to the passage of the Medical Act of 1859 and the establishment of the General Medical Council. The third part examines the main processes which were associated with the emergence of the profession as we know it today in England.

The book discusses England only since schooling and social development in Scotland and other parts of Great Britain were quite different. A few references are made, particularly to Wales, but most of the book is an evaluation of the changes taking place in London and England in particular, due mostly to the influences of the Royal colleges.

The book is very interesting since it is carefully documented and researched. It is not always easy to read since there is a great amount of redundancy and repetition. Some historical facts, probably known by the British public, are not explained to the American who might not be so familiar with British history and the political scene in the mid-nineteenth century. More careful editing would have helped to reduce some of the problem. This, however, does not interfere with the usefulness of the book as a reference for persons interested in the history of the practice of medicine in England. The book has an extensive bibliography and references of the citations are made throughout the text. It also has another section of notes relating to the text and a good index that is very helpful. This book is recommended to those teaching history of medicine particularly of the British system.

—Reviewed by Hannelore T. Loevy, C.D., M.S., Ph.D.
Professor of Clinical Pediatric Dentistry
College of Dentistry
University of Illinois at Chicago


Dr. Jerome M. Schweitzer, a prominent dental practitioner in New York City for over a sixty year period, has written this unique book to summarize his concepts and conclusions. The general format is pleasing, and the quality of the numerous illustrations is excellent.

After a general discussion of restorative dentistry, Dr. Schweitzer, in Chapter 2, presents 10 of his clinical cases, each one using different occlusal concepts and different articulators. He then describes 31 cases demonstrating some aspects of oral rehabilitation. A history, excellent clinical photographs, prints of x-rays and casts are used to illustrate each case and these appear in Chapter 3. In Chapter 4 the author discusses the difference between oral rehabilitation and conformative dentistry, and presents five case reports as examples.

The next section of the book (Chapters 5 and 6) include consideration of 170 of his cases, each carefully discussed and illustrated. An evaluation is made regarding the results of his many years of experience in restorative
dentistry. He includes six tables showing the type of articulator used, the patient's oral health when last seen, etc.

Dr. Schweitzer has kept careful records of his patients over a long period of time, during which many new concepts and new instruments have been developed. His conclusions are that in the hands of experienced, competent operators, any one of the techniques developed may be successful. His philosophy is to beware of just using one instrument or one method, but rather to be "problem oriented." Details of techniques, such as for tooth preparations, are not included in this book.

In a short review it is impossible to discuss Dr. Schweitzer's book in detail. Suffice it to say that this is an unusual volume which condenses 60 years of careful observations of the results of operative dentistry by an excellent dentist. It will appeal to all those dentists interested in tracing the development of the varying concepts of occlusion and oral rehabilitation procedures in this century.

Reviewed by Maynard K. Hine, D.D.S.
Chancellor Emeritus
University of Indiana


Scurvy is uncommon now, but throughout history it was one of the most devastating of nutritional deficiencies. Seafaring voyages and land explorations were completely wiped out when entire crews died as a result of the disease's ravages. Although it is still present in some areas of the world today, its severity is as nothing compared to what it was in earlier times. Necessary dietary staples were either insufficient in amount or else completely lacking, thus being insufficient to support the health of many individuals in such endeavors as the California Gold Rush, the American Civil War and the several Arctic expeditions. Dr. Carpenter reviews the extensive and extremely interesting history of this strange disease and discusses the various theories of causes and treatment that held sway during the course of history.

The special value of citrus fruits was discovered and re-discovered many times over the years, and the author deals with the lack of communication regarding this among several medical historians. It is only in the present century, through the use of experimental animals, that the disease has been proven to be due to a vitamin deficiency.

The author discusses the stress put upon the use of Vitamin C for a variety of illnesses, including the common cold (so highly touted by Dr. Linus Pauling). The evidence for and against using "mega-doses" to obtain "mega-health" is presented in detail. In fact, this book is the first in over 60 years to give full treatment to this illness that had baffled mankind for centuries.

This book is so well written that it will be invaluable to specialist, generalist, dentist, physician or historian. It can also be read with ease by the layman and is valuable for special assignment to college students.

This reviewer would like to extend congratulations to Professor Carpenter for an outstanding presentation of such important historical material.

Reviewed by Lloyd E. Church, D.D.S., Ph.D.
Associate Professor of Surgery
The George Washington University
Medical Center Washington, D.C.

As pointed out by the authors in their preface, it is only in the present century that physicians and dermatologists have begun to pay attention to the dynamics of hair growth and the mechanisms underlying many of the commonly observed disturbances accompanying it. Advances in scientific endocrinology have greatly increased our knowledge of endocrine influences on hair, and we are now much more aware of metabolic and nutritional influences on the density, pattern, color, and texture of hair. Except for those abnormalities of hair which result from external infection or from chemical or physical trauma, almost all others are caused by or are related to systemic processes. The statement has been made that a woman who has experienced a sudden and drastic loss of hair should be considered as much a medical emergency and deserving of the physician’s attention as one with a pain in the chest or abdomen or any other symptom or complaint.

This is a most complex, masterful and comprehensive text on the human hair and scalp. The first chapter deals with the comparative physiology, embryology and physiology of human hair. The second with hair follicle structure, keratinization and physical properties of hair. The third with the hair in infancy and childhood, and the next with hair patterns in baldness and hirsutism. Other chapters consider such subjects as diffuse alopecia with a consideration of endocrine, metabolic and chemical influences on hair; hypertrichosis; traumatic and cicatrical alopecias; alopecia areata; and even hair cosmetics. Attention is devoted to the hair and scalp in systemic diseases and nevi, tumors and cysts of the scalp.

One of the most impressive features of this text is the thorough and exhaustive bibliography which accompanies each chapter. There are many drawings and photographs to illustrate the various scalp conditions and scalp disorders.

Of great interest to this reviewer and, one may be certain to many dermatologists and even physicians in general practice, is the very excellent section dealing with alopecia areata. The authors reveal the various theories as to etiology of the condition as well as its treatment. The latter subject is very much up-to-date, dealing as it does with the use of PUVA as well as the induction of contact sensitization.

Those who have even a mild interest in the human scalp and its diseases and disorders may well be grateful to these authors for a magnificent treatise. It should occupy a prominent place on the bookshelves of all such and is to be highly recommended.

—Reviewed by John A. Kenney, Jr., M.D.
Howard University
Washington, D.C.

(Book Review Editor’s note: This book contains material which is not normally related to dentistry. However, it is so well written, with an excellent bibliography and illustrations, that it deserves consideration. There are many dentists, auxiliary personnel and patients who have hair and scalp problems, and therefore an awareness and understanding of the subject will be a decided advantage. The reviewer, in addition, is a world-renowned dermatologist.)
Hungary is justly proud that the great Ignace Semmelweis, the conqueror of childbed fever — which took an untold number of lives of hapless pregnant women at childbirth — was a native of that land.

One of the most complete museums and archives relating to the history of medicine in eastern Europe exists in Budapest, and it was fitting therefore to name the institution after the great benefactor.

The museum-library periodically issues a valuable journal *Comunicaciones de Historia Artis Medicinae*, and this book is a special supplement to the magazine.

The book is written in German, and to one who is conversant with that language, it is a storehouse of information concerning the growth and development of medical practice in eastern Europe. It starts with a discussion of Semmelweis' birthplace and family home and is adorned with numerous photographs of the great man's home and neighborhood and of the hospitals in which he worked. Semmelweis' life and accomplishments are next traced (he lived from 1818 to 1865) and this is followed by a lengthy bibliography of works which cover Semmelweis' demise. Hounded out of Vienna by the medical establishment for his unorthodox views concerning the necessity of cleanliness in the delivery room, he relocated to his native Budapest where he became professor of obstetrics at the university in that city and there published his famous work, "The cause, concept and prophylaxis of puerperal fever." Unfortunately, his sensitive nature was not equal to the stresses put upon it by the controversies he had generated and he became insane and died at the early age of 47.

Following the material about Semmelweis is a thorough, well illustrated discussion of the development of medicine and healing from ancient times through the middle ages, ending with an account of healing in the 17th and 18th centuries. All of the illustrations — and there are many of them — come from the Museum's own collections, and many of them have never been seen by scholars in western lands.

The book concludes with a lengthy description of the origins of alchemy and its successor, pharmacy, and traces these activities to modern times.

More or less as an addendum is a thorough description of the holdings of the Museum and its library, in general terms, followed by a description of other museums of pharmacy and medicine in Hungary.

This book is available from Ignace Semmelweis Museum of the History of Medicine, Torok utca 12, Budapest H-1023, Hungary.


The history of penicillin has been written many times by many people. Each is different, for each one reflects the author's experiences and reasons for telling his or her story. No book about penicillin will really ever be complete because the subject is too vast. Gladys Hobby tells her version, as an
individual and as a microbiologist who actually took an active part in many of the historical events.

Dr. Hobby was active in research at Columbia University College of Physicians and Surgeons from 1934-1944; as a microbiologist at Pfizer, Inc. from 1944-1959; and as Chief of a Veterans Administration research laboratory from 1959 until her retirement in 1977.

Most histories have not dealt adequately with the development of penicillin as a therapeutic agent at any stage. Such coverage has been possible in this book because of the personal involvement of Dr. Hobby. She was there from the humble beginnings, through the clinical trials, the steps of production and on through continuing research to secure more effective antimicrobials. Her accuracy and precision in documentation cannot be equalled; this adds immensely to the value of the book.

This book is filled with facts little known to the general public. The first commercial plant for the large scale production of penicillin was located in the old Rubel Ice Plant, near the Pfizer plant in Brooklyn, New York, on March 1, 1944. It was suitable for the purpose because it had the necessary and suitable refrigeration equipment. It was from this plant that much of the penicillin used for the D-Day casualties came.

The story of penicillin and more recent microbials is still unfolding. Research continues to provide new and exciting results to benefit mankind. But, the first and most important was penicillin. The number of people involved, the countries, laboratories, money and governments that cooperated, present a miracle as great as the drug itself.

This is a book that can be read by professionals and non-professionals alike. It gets detailed at times, but this seems to make the story more exciting. You will read the story of a drug that, in one way or another, has directly affected every one of us. You will enjoy every page as you relive history in your lifetime.

—Reviewed by Lloyd E. Church, D.D.S., Ph.D.
Associate Clinical Professor of Surgery
George Washington Medical Center
Washington, D.C.


This illuminating and extensive report by two eminent medical historians assesses the record of the creator of the celebrated sleuth, Sherlock Holmes, not only as a writer of fiction, but as a contributor to the literature and history of medicine. The physician and his works are thoroughly studied, documented, classified, and judged in the light of the culture, science and medical knowledge of his time.

Contrary to popular belief, Conan Doyle was a successful practitioner of medicine, though hardly as adept in his profession as he was in the portrayal of intriguing tales with a pen. From his earliest adventures as a ship's surgeon, first off the West Coast of Africa, later in the Arctic on a whaler, he was busily engaged in the treatment of the fears and ills of his fellow man. Less than two years after receiving the degrees of Bachelor of Medicine (M.B.) and Master of Surgery (C.M.) from the prestigious University of Edinburgh in 1881, his shingle was attached to a house in Southsea in July 1882,
conveniently located within a few hundred yards of the most prominent in-
habitants of Portsmouth. He observed:

It is just six months today since I walked into this house with a small
portmanteau and an ulster... I have a fine brass plate, and a big red
lamp. I have paid 26 pounds rent and taxes — and all without borrowing
a penny, and I don’t owe as much as I am owed now. So I think that
is a very satisfactory result.

The accomplishment is all the more striking because the doctor had come
as a stranger to Portsmouth, one of the healthiest places in the kingdom,
a city of 130,000 population already served by 53 physicians and surgeons,
though there were probably nine quacks to every qualified practitioner. Doctor
Doyle credited the success of his venture into practice to a few medical col-
leagues and a dentist who “sends me on anything that he can”, plus fortu-
tuous circumstances. Nonetheless, the doctor’s personality should not be
overlooked; in his own words:

I mixed with people so far as I could, for I learned that a brass plate alone
will never attract, and people must see the human being who lies in wait
behind it.

The man behind the plate was a human and humane practitioner who com-
bined an excellent medical education with humility and humor, a compas-
sionate and dedicated physician.

In December, 1883, he was “up to (his) eyes in work”. First year earnings
were 154 pounds, in the second year 250 pounds, slowly rising thereafter
to 300 pounds, a figure never surpassed; nothing outstanding but quite ac-
ceptable at the time, being four times the wage of a skilled craftsman, such
as a carpenter or mason. Doyle himself considered “200 pounds from
medicine with a little help from publishers... quite a swagger income”. Yet seven years later he left Portsmouth and his practice, by then largely ophthal-
mic, never to return.

The circumstances that led him to abandon medicine disclose a frustrated
spirit. Ten years of “oculism, occultism, and... writing, with a little cricket
as a corrective” yielded to a broader field of activity that began with a trip
to Berlin to study a new cure for tuberculosis reported by Koch in 1890. This
resulted in Conan Doyle’s Dr. Koch and His Cure, an early erudite critique
of the efficacy of tuberculin as a therapeutic agent. The trip also brought
him into contact with a London skin specialist who persuaded him to go
to Vienna for training, specialize in the eye, and join the “big men” in Bri-
tain’s capital. On April 6, 1891, Conan Doyle opened his London office; on
May 4 he closed it, suffering from a bad case of influenza.

It was then, as I surveyed my own life, that I saw how foolish I was to
waste my literary earnings in keeping up an oculist’s room in Wimpole
Street, and I determined with a wild rush of joy to cut the painter and
to trust forever to my power of writing.

In that month his only visitor was the tax collector; for his literary efforts
he had received 177 pounds.

Arthur Conan Doyle, the author, began his career in medical school; one
letter to the editor on gelsemium and two short stories appeared in print.
Between graduation and the start of his practice in Southsea he produced
three short stories. While in practice he contributed to the literature of
medicine seven letters to the editor: on leukemia, contagious diseases, the
gout, in support of smallpox vaccination (three), and one critical of Koch’s
tuberculosis cure. In addition, he found time to write three short stories with
medical plots, two articles — one on blood infections, the other that on Dr.
Koch — and an extensive thesis on tabes dorsalis that earned him the M.D. degree from Edinburgh in 1885, the doctorate being contingent on the M.B. conferred on him four years earlier.

Particularly busy were the years between his marriage in 1885 and 1890. They saw the blossoming of Conan Doyle as a novelist and fiction writer. In that period forty short stories and five novels were published, two of which featured that paragon of deduction, Sherlock Holmes, and his ready companion, John H. Watson, M.D., A Study in Scarlet and The Sign of Four.

After my marriage . . . my brain seems to have quickened and both my imagination and my range of expression were greatly improved.

Further . . .

It (one of the novels) was written in the intervals of a busy though ill-paying practice.

On abandoning all attempts at private practice in 1891, the doctor stayed in London until volunteering for service in the Boer War as one of the medical staff of an army hospital unit assigned to a typhoid-ridden camp at Bloemfontein in the Orange Free State, where he attended to the demanding medical needs of hundreds in a hell hole between April and July 1900. The experience engendered three important works: a history The Great Boer War; a pamphlet The War in South Africa. Its Cause and Conduct; and an article on typhoid fever. The pamphlet, distributed abroad in several languages, revealed its author to be a patriot and propagandist as much as he was a writer; it turned world opinion in favor of Britain. His reward: Dr. A. Conan Doyle became Sir Arthur, knighted by Edward VII in 1902. It was only a coincidence that the best known of his detective stories, The Hound of the Baskervilles, had just appeared.

Throughout his literary career of half a century, Doyle was ever the physician, evident in a wide range of activities as citizen, politician, spiritualist, and author. Nineteen short stories and two novels have predominantly medical themes; in only one, The Empty House, is dentistry a part of the story. The Medical Case Book is a prodigious study, indeed a history, of an extraordinary student and practitioner, of his medical and nonmedical writings, and of the interlocking relationships between the author's experiences and the spirit and dash of his Sherlockian characters. It is not only the account of a physician and an uncommonly gifted writer revisited, but a mirror of medicine of the late nineteenth century.

—Reviewed by H. Berton McCauley, D.D.S.
Secretary-treasurer
American Academy of the
History of Dentistry
Baltimore, Maryland


This is a fascinating and detailed account of the events that led to the death of Frederick III of Prussia from laryngeal carcinoma . . . just 99 days after he ascended the throne of the German Empire. His untimely death no doubt affected the destiny of Europe and the world by destroying Germany's best hope for democratic reform at that time.

Dr. Lin's book, based on research of original documents, indicates the
problem was compounded by the area in which the pathosis existed, since this hid the existence of cancer almost to the end. The laboratory work performed at that time was directed by Rudolph Virchow, regarded as the father of modern pathology. Sadly, he failed to spot this rare form of cancer because of insufficient knowledge of the disease at that time.

Frederick "suffered without complaint" throughout his ordeal. He displayed such courage and dignity in his battle against his cancer that he remains an admired and heroic figure to this day. The cast of physicians in the fascinating drama include the eminent laryngologist, Morell Mackenzie of England, a number of German physicians as well as Virchow, the pathologist.

It is a story of indecision and jealousy among physicians, made more bitter since the patient was a world leader and a German and an Englishman, Dr. Mackenzie, was the primary physician. The result was medical mismanagement at its worst! The result, embroiled with domestic and international politics, caused an uproar on both sides of the English Channel. By the time the cancer was confirmed, it was too late. Nevertheless, even if the growth had been removed when first discovered, he would probably not have survived the operation, which was 100% fatal at the time.

This is also a love story between a world leader and his wife Vicky and their relation to each other and their people. Political conflict also played a part. Vicky was the eldest daughter of England's Queen Victoria. They wished to reform the autocratic German political system but they never got the chance. Time, cancer and the German chancellor, Otto Von Bismark, were against them. Their eldest son, Wilhelm, succeeded to the throne and eventually plunged Germany into World War I. This book is highly recommended to anyone interested in the history of medicine and the political consequences of diseases of leaders of nations.

—Reviewed by Lloyd E. Church, D.D.S., Ph.D.
Associate Clinical Professor of Surgery
The George Washington University
School of Medicine
Washington, D.C.

EVERY MAN HIS OWN DENTIST

Messrs. Hood & Reynolds:

Dear Sirs:

Your gold foil works o.k. for the purpose I use it for. Now I would like to use it for my family to fill teeth with, if you will tell me how to use it. This is between me and you. Nobody else will know anything about it. I will purchase the foil of you, and I will get a few instruments of you, you know what few instruments I need to fill a tooth. Common instruments will do for me; and also tell me the price of the instruments. I do not want too expensive ones. Please let me know by return mail. This is between us. Enclosed stamp for answer, and oblige.

Yours truly ____________________

(Letter to a dental supply house, reprinted in Welch's Monthly, Vol. 1, No. 7, February 1897.)
ALABAMA
Charles C. Alling, D.D.S.  
1919 Seventh Avenue South,  
Birmingham 35233
William J. DuBose, D.M.D.  
3843 Narrow Lane Road,  
Montgomery 36111
Mark E. Connelly, D.D.S.  
University of Alabama School of Dentistry, SDB Box 36, Birmingham 35294
Ralph M. Nix, D.D.S.  
P.O. Box 655, Red Bay 35582
John W. Nixon, D.D.S.  
1728 Twentieth Street West,  
Birmingham 35218
Joseph E. Volker, D.D.S., Ph.D.  
University of Alabama, SDB Box 85, University station, Birmingham 35294

ARIZONA
William B. Bartel, D.M.D.  
7600 Camelback Road #8,  
Scottsdale 85251
William J. Darrington, D.D.S.  
8709 North Eleventh Avenue,  
Phoenix 85021
Michael McFadden, D.M.D.  
Box 1572, Sedona 86336
Donald C. Simpson, D.D.S.  
2520 East Wilcox Drive,  
Sierra Vista 85635

ARKANSAS
Daniel Glenn Fields, D.D.S.  
1212 West Second Street  
Russellville 72801
Joseph D. Patterson, D.D.S.  
333 East Market Avenue,  
Searcy 72143

CALIFORNIA
Philip B. Allen, D.D.S.  
2809 “G” Street, Bear Creek Plaza,  
Merced 95340
Roger M. Anderson, D.D.S.  
1477 Marino Avenue #1,  
San Marino 91108
J. Alan Bloore, D.D.S., M.S.  
300 South Beverly Drive #101,  
Beverly Hills 90212
James M. Cahill, D.D.S.  
1024 Isabella Avenue, Coronado 92118
Donald K. Campbell, D.D.S.  
2525 “K” Street #308,  
Sacramento 95816
Jimmie Jin Huan Choi, D.D.S.  
1131 North Vermont Avenue #201,  
Los Angeles 90029
Sonney L. Chong, D.M.D.  
5665 Freeport Boulevard,  
Sacramento 95822
Donald L. Corbett, D.D.S.  
2021 Montrose Avenue,  
Montrose 91020
Lloyd L. Cottingham, D.D.S.  
2665 Fourth Avenue, San Diego 92103
Col. William P. Cruse  
CDR Tenth Medical Detachment DS,  
APO San Francisco 96301
David Michael Donnelly, D.D.S.  
2330 First Avenue #203,  
San Diego 92101
Clifton O. Dummett, D.D.S., M.P.H.  
P.O. Box 77006, Los Angeles 90007
Col. Robert L. Engelmeier  
453-2 “A” Street,  
Travis Air Force Base 94535
John D. Fazio, D.D.S.  
310 West Shaw, Fresno 93704
Bernard H. Faubion, D.D.S.  
4436 Conchita Way, Tarzana 91356
Mary B. Faubion, R.N.  
4436 Conchita Way, Tarzana 91356
Virgil L. Galey, D.D.S.  
Grove Medical Arts Building #201,  
12665 Garden Grove Blvd.,  
Garden Grove 92643
Stephen B. Goldman, D.D.S.  
655 North Central Avenue #251,  
Glendale 91203
Jon Douglas Harmon, D.D.S.  
9561 Ball Road, Anaheim 92804
Berthal J. Hartman, D.D.S.  
92 Parkside Avenue, Daly City 94015
Mr. Mark J. Honig  
Ted Williams Dental Services,  
11254 Dilling Street,  
North Hollywood 91602
Robert E. Horsemann, D.D.S.  
9209 South Colima Road #3500,  
Whittier 90605
William E. Hoskins, D.M.D., M.S.
Dentistry Room S-619, University of California, San Francisco 94143

Chesley R. Houske Jr., D.D.S.
3405 Manhattan Avenue,
Manhattan Beach 90266

Thaddeus S. Krzywicki (Student)
29 Via Floreado, Orinda 94563

3160 Steven Drive, Encino 91346

Ivan L. Lapidus, D.D.S.
10921 Wilshire Boulevard,
Los Angeles 90024

Stephen L. Larson, D.M.D.
2650 California Street #70,
Mountain View 94040

Gary D. Lemen, D.D.S.
2650 Twenty-First Street #3,
Sacramento 95818

John J. Lytle, D.D.S., M.D.
1370 Foothill Boulevard #200,
La Canada 91011

Michael W. Marshall, D.D.S.
415 Herondo Street #142,
Hermosa Beach 90254

Laurence S. Masuoka, D.M.D.
4910 Walnut Avenue,
Sacramento 95841

Wynn Masaru Matsumura, D.D.S.
403 Twenty-Fifth Avenue #a,
San Francisco 94121

Heidi Meinke, D.D.S.
13522 Moorpark Boulevard,
Sherman Oaks 91423

Salvatore Menasche, D.D.S.
7427 Caminito Carlotta,
San Diego 92120

Wilma E. Motley, R.D.H.
18952 Blackhawk Street,
Northridge 91326

Alvin B. Rosenblum, D.D.S.
11665 West Olympic Boulevard #306,
Los Angeles 90064

Richard R. Rutter, D.D.S.
673 Emerald Hill Road,
Redwood City 94061

Fatemeh Sh. Sadrieh, D.D.S.
1029 Glenhaven Drive,
Pacific Palisades 90272

Donald H. Salk, D.D.S.
21605 Hawthorne Boulevard,
Pavilion C, Torrance 90503

J.S. de C.M. Saunders, M.D. (Honorary)
School of Medicine, University of California, San Francisco 94122

Susan R. Sheldon, D.D.S.
4185 Twenty-Fourth Street,
San Francisco 94114

Louis R. Silveira, D.D.S.
3564 Highland Avenue,
San Diego 92105

David Stevenson, D.D.S.
1140 Fremont Avenue,
South Pasadena 91030

John C. Swearingen, D.D.S.
190 North Thor, Turlock 95380

Dr. Paul R. Thomassen Jr.
111 Camaritas Avenue,
South San Francisco 94080

Lane Thomsen, D.D.S., M.S.
School of Dentistry, Loma Linda University, Loma Linda 92354

J. Forbes Watson, D.D.S., M.S.Ed.
Center for Health Sciences, University of California, Los Angeles 90024

Ronald P. Wormser, D.M.D.
910 Via De La Paz,
Pacific Palisades 90272

Donald R. Yent, D.D.S.
853 Middlefield Road,
Palo Alto 94301

COLORADO

Dana J. Johnson, D.D.S.
Canyon Professional Center #202,
2355 Canyon Boulevard, Boulder 80302

Beryl Ritchey, D.D.S.
525 Penrose Boulevard,
Colorado Springs 80906

CONNECTICUT

Leonard P. Hellerman, D.D.S.
62 Bloomfield Avenue, Windsor 06095

Frederic P. Hollander, D.D.S.
35 South High Street,
New Britain 06051

Wilbur D. Johnston, D.D.S., M.D.
345 Whitney Avenue,
New Haven 06511

Robert A. Kremez Jr., D.M.D.
23 Greenacre Drive,
Huntington 06484

Leonard F. Menczer, D.D.S., M.P.H.
44 Cumberland Road,
West Hartford 06119

Michael C. Niekrash, D.D.S.
18 Asylum Street #705,
Hartford 06103

Alex M. Rudewicz, D.D.S.
17 Canal Street, Weatogue 06089

Nicholas A. Sharp, D.D.S.
P.O. Box 256, Branford 06405

William R. Tyson, D.D.S.
574 Congress Avenue,
New Haven 06519

Stanton H. Wolfe, D.D.S.
756 Park Avenue, Bloomfield 06002
DISTRICT OF COLUMBIA
Kermel E. Banks, D.D.S.
7431 Twelfth Street N.W.,
Washington 20012
Andrew Christopher, D.D.S., M.H.A.
School of Dentistry, Georgetown
University, 3900 Reservoir Rd.,
Washington 20007
William K. Collins Sr., D.D.S.
4645 Burroughs Avenue N.E.,
Washington 20019
Helga E. Ehudin, D.M.D.
4105 Wisconsin Avenue N.W. #111,
Washington 20016
Henry J. Heim, D.D.S.
4633 Forty-First Street N.W.,
Washington 20016
Daniel P. Jones, Ph.D.
Nat'1 Endowment for the Humanities,
1100 Pennsylvania Ave. N.W. #MS-319,
Washington 20506
Richard P. Mumma, D.D.S., M.P.H.
3265-C Sutton Place N.W.,
Washington 20016
John S. Ostrowski, D.M.D.
WNV Branch Dental Clinic,
Building 166, Washington 20374
Rahele E. Rezai, D.M.D., M.A.
P.O. Box 11462, Washington 20008
Col. Clyde L. Roggenkamp
OLA, USAF Medical Center SGDB,
Bolling Air Force Base,
Washington 20332
Irving M. Rothstein, D.D.S.
1111 Nineteenth Street N.W. #210,
Washington 20036
Mark P. Ryan, D.D.S.
3036-B Cambridge Place N.W.,
Washington 20007
Joseph R. Salcetti, D.D.S.
5207 Wisconsin Avenue N.W.,
Washington 20015
Israel Shulman, D.D.S.
5002 Massachusetts Avenue N.W.,
Washington 20016
7541 Sixteenth Street N.W.,
Washington 20012
Vu Thi Thin, D.D.S.
7060 Thirty-First Street N.W.,
Washington 20015

FLORIDA
Hayden P. Allen, D.D.S.
138 Country Club Court,
Tarpon Springs 33550
Col. Angel D. Alvarez
281 Honeysuckle Way, Niceville 32578
Irene G. Bober-Moken, M.S., D.M.D.
PCS Box 5167, APO Miami 34001
George S. Cinci, D.D.S.
8464 Northwest 25th Place,
Coral Springs 33065
Armondo F. Cobelo, D.D.S.
1400 Southwest 84th Court,
Miami 33144
Joe E. Dunlap, D.D.S.
1816 Lombardy Drive,
Clearwater 33515
Henry T. Ellison, D.D.S.
6031 Northwest 4th Avenue,
Boca Raton 33431
W. Frank Evans Jr., D.D.S.
310 Doctors Gardens, Sarasota 33579
Fred Stewart Feld, D.M.D.
715 Forty-Ninth Street North,
St. Petersburg 37710
Mrs. Claire G. Hennessy
1124 Seminole Drive #4C,
Fort Lauderdale 33304
Alvin L. Krasne, D.D.S.
1005 Northeast 125th Street, #107
North Miami 33161
Dr. Paul W. Krier
1000 Northwest 10th Street
Boca Raton 33432
Cesar A. Mena, D.D.S.
1200 Southwest 18th Street,
Miami 33145
Dr. George H. Miyares
6321 Thirteenth Avenue North,
St. Petersburg 33710
Sherwood E. Moore, D.D.S.
2120 Northeast 21st Street,
Fort Lauderdale 33305
Jerry L. Reynolds, D.D.S.
601 West Buffalo Avenue,
Tampa 33603
Joseph F. Snyder Jr., D.D.S.
159 Broadway, Daytona Beach 32118
Robert Thoburn, D.D.S.
1908 South Peninsula Drive,
Daytona Beach 32018
Robert Roy Thousand Jr., D.D.S.
157 Marine Street #4,
St. Augustine 32084

GEORGIA
Ronald E. Goldstein, D.D.S.
1218 West Paces Ferry Road N.W. #200,
Atlanta 30327
John A. Morgan, D.D.S.
1009 Third Avenue, West Point 31833
Elizabeth L. Salley, D.M.D.
CSH Box 17, Milledgeville 31061
Richard B. Shapiro, D.D.S.
427 Moreland Avenue #200,
Atlanta 30307

Larry W. A. Townsend, D.M.D.
678 Clinton Way West, Martinez 30907

Mr. Harry L. Wright
1534 Edinburgh Drive, Tucker 30084

GUAM
J. Henry Hoffmann, D.M.D., D.D.P.H.
Drawer 8170, Tamuning 96911

ILLINOIS
Diane M. Beecher, D.D.S.
202 Arbours, Savoy 61874
Max M. Chubin, D.D.S.
6122 Lincoln Avenue, Chicago 60659
Gordon E. Dammann, D.D.S.
Box 516, Lena 61048
B. F. Dewel, D.D.S.
2007 Bennett Avenue, Evanston 60201
Keith Winfield Dickey, D.D.S.
322 Whispering Oaks Drive,
Bethalto 62010
Richard A. Glenner, D.D.S.
3414 West Peterson Avenue,
Chicago 60659
Curt J. Gronner, D.D.S.
16959 Tanglewood Drive,
Morrison 61270
Michael Harada, D.M.D.
2946 Floral Drive, Northbrook 60062
Bruce E. Hochstadter, D.D.S.
Parkside Center, 1870 Dempster #470,
Park Ridge 60068
Barry A. Janov, D.D.S.
2434 Dempster Street #112,
Des Plaines 60016
Gary Robert Johnson, D.D.S.
3033 West Ogden Avenue, Lisle 60532
Mrs. Iris Kapp
508 Alexandria Drive,
Vernon Heights 60061
Aletha M. Kowitz, M.A.
American Dental Association,
211 East Chicago Avenue,
Chicago 60611
Barry A. LaCombe, D.M.D.
1436 Wentworth Court,
Vernon Hills 60061
Hannelore T. Loeyv, C.D., Ph.D.
5524 South Harper Avenue,
Chicago 60637
Vincent B. Milas, D.D.S.
9412 South 82nd Avenue,
Hickory Hills 60457
Ellis J. Neiburger, D.D.S.
1000 North Avenue, Waukegan 60085
Norman H. Olsen, D.D.S., M.S.D.,
Dean, Dental School,
Northwestern University,
240 East Huron Street, Chicago 60611
Frank J. Orland, D.D.S., Ph.D.
519 Jackson Boulevard,
Forest Park 60130
Alex Peck, M.A.
P.O. Box 710, Charleston 61920
Robert M. Pick, D.D.S., M.S.
95 Trade Street #104, Aurora 60505
Robert J. Pollock, D.D.S.
1 Wheaton Center #412, Wheaton 60187
Jack S. Ragsdale, D.D.S.
171 Park Plaza, Cantow 61520
Robert D. Rankin, D.D.S.
134 North Sangamon Avenue,
P.O. Box 271, Gibson City 60936
David J. Reisberg, D.D.S.
University of Illinois Hospital,
P.O. Box 6998, m/c 588, Chicago 60680
Susan Weller, D.M.D.
1614 West Lafayette Avenue,
Jacksonville 62650
Samuel S. Wexler, D.D.S.
721 Palm Drive, Glenwood 60425

INDIANA
Richard Buchanan, D.D.S.
Citizens National Bank Building #311,
Bedford 47421
Arden G. Christen, D.D.S., M.S.D.
7112 Sylvan Ridge Road,
Indianapolis 46240
Indiana University,
121 West Michigan Street,
Indianapolis 46202
David J. Howell, D.D.S.
839 Auto Mall Road #C,
Bloomington 47401
Yiming Li, D.D.S., Ph.D.
Oral Hygiene Research Institute,
410 Beauty Avenue,
Indianapolis 46202
Ralph E. McDonald, D.D.S., M.S.,
Dean, Indiana University
School of Dentistry,
1121 West Michigan Street,
Indianapolis 46202
Clay W. Stuckey, D.D.S.
1326 “L” Street, Bedford 47421
Lynn Robert Thomas, D.D.S.
1731 East Bristol Street, Elkhart 46514
James M. Vanes, D.D.S.
8687 Connecticut Street,
Merrillville 46410
IOWA
Mrs. Nellie W. Kremenak,
Health Sciences Librarian,
Dows Institute for Dental Research,
University of Iowa, Iowa City 52240
David O. Moline, D.D.S.
Department of Dentistry,
University of Iowa Hospital,
Iowa City, 52242
Floyd W. Pillars, D.D.S.
505 Fifth Avenue #348,
Des Moines 50309

KANSAS
William J. Carter, D.D.S., M.S.
7612 West 95th Street #A,
Overland Park 66212
Dr. Newell O. Feeley
1334 Campbell Avenue, Topeka 66604
Mark E. Mosier, D.D.S.
6 North Broadway, Herington 67449
William R. Nordstrom, D.D.S.
1690 West Fourth Street,
P.O. Box 812, Colby 67701
David M. Stevens, D.D.S.
13031 Kansas Avenue,
Bonner Springs 66012

KENTUCKY
Cynthia Chappelka, R.D.H.
359 South Mill Street, Lexington 40508

LOUISIANA
James F. Gardiner, D.D.S.
4928 Hastings Street, Metairie 70006

MARYLAND
Stanley L. Becker, D.D.S.
500 West University Parkway,
Baltimore 21210
Alex L. Boro, D.D.S.
2900 Shipmaster Way #309,
Annapolis 21401
I. Norton Brotman, D.D.S.
6615 Reisterstown Road #105,
Baltimore 21205
Noel L. Capestany, D.M.D.
5620 St. Barnabas Road #350
Oxen Hill 20745
W. Brent Christensen, D.M.D.
c/o Richard Johnson,
3402 Hewitt Avenue,
Silver Spring 20906
Lloyd E. Church, D.D.S., Ph.D.
4833 Cordell Avenue #322,
Bethesda 20814
Jacqueline A. Clarke-Martin, D.D.S.
7222 Mandan Road, Greenbelt 20770
James F. Craig, Ed.D.
Baltimore College of Dental Surgery,
666 West Baltimore St., Baltimore 21201
John A. Crowley, D.D.S.
4743 Bradley Boulevard,
Chevy Chase 20815
Audrey B. Davis, Ph.D.
1214 Bolton Street, Baltimore 21217
David A. Denisch, D.D.S.
120 Sister Pierre Drive #302,
Towson 21204
Frank A. Dolle, Ph.D., D.D.S.
1213 Dulaney Valley Road,
Towson 21204
Darwin R. Drewyer Jr., D.D.S.
11000 New Hampshire Avenue,
Silver Spring 20901
Gardner P. H. Foley (Honorary)
4407 Sedgwick Road, Baltimore 21210
Larry Greenbaum, D.D.S.
Highland House #208,
5480 Wisconsin Avenue,
Chevy Chase 20815
Alfred R. Henderson, M.D.
5208 Danbury Road, Bethesda 20814
Lillian V. Henderson, M.Ed., M.S.W.
2537 Fairhill Drive, Suitland 20746
John M. Hyson, D.D.S., M.S.
7600 Osler Drive #306, Towson 21204
Dr. James T. Jackson
3512 Sandy Court, Kensington 20895
Dr. Donald W. Johnson
4236 Norbeck Road, Rockville 20853
M. Pitkin Johnson, D.D.S.
8025 Governor Ritchie Highway,
Pasadena 21122
Kalambayi Th. Kabesela, D.D.S.
14255 Ballinger Terrace, Laurel 20707
W. Michael Kenney, D.D.S., M.S.
209 Mountain Road, Fallston 21047
Christian A. King, D.D.S.
10907 Adler Court,
Upper Marlboro 20772
David Knopf, D.M.D., M.S.Ed.
10 Gerard Avenue, Timonium 21093
Frederick Magaziner, D.D.S.
7650 Belair Road, Timonium 21093
Ke Il Mah, D.D.S.
13829 Bethpage Lane,
Silver Spring 20906
Charles P. McCausland, D.D.S.
3611 Worthington Avenue,
Glyndor 21071
H. Berton McCauley, D.D.S.
3804 Hadley Square East,
Baltimore 21218
665th Medical Detachment DS,
APO San Francisco 96218

Richard Stephen Perez, D.D.S., M.S.
12200 Candle Light Circle,
Fort Washington 20744

Alan P. Perkin, D.D.S.
7600 Osler Drive #108, Towson 21204

Anh H. Pham, D.D.S.
5018 Adrian Street, Rockville 20853

Jean-Maurice Poitras, M.D.
107 Edgerton Road, Towson 21204

Errol L. Reese, D.D.S., Dean
Baltimore College of Dental Surgery,
666 West Baltimore St.,
Baltimore 21201

Markus Ring, M.D.T.
10201 Grosvenor Place #710,
Rockville 20852

Mildred Romans, D.D.S.
17904 Georgia Avenue #215,
Olney 20832

Jacob J. Rosenberg, D.D.S.
4405 East-West Highway,
Bethesda 20814

Gordon H. Rovelstad, D.D.S., Ph.D.
American College of Dentists,
7315 Wisconsin Avenue,
Bethesda 20814

William H. Ryan, D.D.S.
136 Virginia Avenue,
PO. Box 2165, Cumberland 21502

Ben Z. Swanson Jr., D.D.S.
Baltimore College of Dental Surgery,
666 West Baltimore St.,
Baltimore 21201

Henry A. Swanson, D.D.S.
c/o Mr. John H. Swanson,
6003 Kirby Road, Bethesda 20817

Richard Carlos Tatum, D.D.S.
1000 Century Plaza #100,
Columbia 21044

George P. Thomas, D.D.S.
2119 Aventurine Way,
Silver Spring 20904

H. Martin Deranian, D.D.S.
Slater Building #315,
390 Main Street, Worcester 01608

Henry D. Epstein, D.M.D.
461 Commonwealth Avenue,
Boston 02215

Erling M. Johansen, D.M.D., Dean
Tufts School of Dental Medicine,
1 Kneeland Street, Boston 02111

Charles B. Millstein, D.M.D., M.P.H.
1648 Massachusetts Avenue,
Cambridge 02138

Charles S. Paraskis, D.M.D.
Boston University,
School of Graduate Dentistry,
100 East Newton Street, Boston 02118

Douglas W. Stewart, D.M.D.
210 Whiting Street, Hingham 02043

Michael C. Stone, D.M.D.
77 Beacon Street, Boston 02108

MICHIGAN

Jeffrey H. Ahlin, D.D.S.
198 Ash Street, Reading 01867

Malcolm Bank, D.D.S.
27 Union Street #3,
Brighton, Boston 02135

Robert A. Berkowitz, D.D.S.
20 Temi Road, Framingham 01701

David A. Chernin, D.M.D.
24 Pontiac Road, Waban 02168

Edgar S. Bacon, D.D.S.
PO. Box 86, Traverse City 49685

Ronald D. Berris, D.D.S.
6400 Farmington Road,
West Bloomfield 48033

Paul Roger Fulton, D.D.S.
232 North Grand,
PO. Box 308, Schoolcraft 49087

Arthur M. Hamparian, D.D.S.
18181 Oakwood Boulevard #103,
Dearborn 48124

Jerome A. Jaffee, D.D.S.
9001 East Fifteen Mile Road,
Sterling Heights 48077

Francis X. Kelly, D.D.S.
18867 Canterbury, Livonia 48152

Paul F. Nelson, D.D.S.
2505 Ardmore Street S.E.,
Grand Rapids 49506

Stanley L. Tulak, D.D.S.
1905 Marlow, Warren 48092

Donald A. Washburn, D.D.S.
3385 Second Street, Route 3,
Wayland 49348

MASSACHUSETTS

Jeffrey H. Ahlin, D.D.S.
198 Ash Street, Reading 01867

Malcolm Bank, D.D.S.
27 Union Street #3,
Brighton, Boston 02135

Robert A. Berkowitz, D.D.S.
20 Temi Road, Framingham 01701

David A. Chernin, D.M.D.
24 Pontiac Road, Waban 02168

Lester E. Block, D.D.S., M.P.H.
1360 Mayo Building, Box 197,
University of Minnesota,
Minneapolis 55455

Christopher E. Carroll, D.M.D.
166 West Third Street, Winona 55987

Harry C. Hagman, C.D.T.
6122 Portland Avenue South,
Minneapolis 55417

MINNESOTA
MISSOURI
Dr. C. Faris Elzea
710 Westmount, Columbia 65203
Sam E. Hayes, D.D.S.
Brookside Dental Center,
101 East 63rd Street,
Kansas City 64113
William Chad McCoy, D.D.S.
511 Elm Street, Chillicothe 64601
Philip G. O’Rourke, D.M.D.
33 South Euclid Avenue #3a,
St. Louis 63108
Earl E. Shepard, D.D.S.
Parkway Tower #307,
225 South Meramec Avenue,
St. Louis 63105
Robert W. Vit, D.D.S.
1810 West 11th Street, Sedalia 65301

NEBRASKA
Bill Combs
c/o Van Horn,
2610 South 60th Street, Lincoln 68506
Leslie C. Erickson, D.D.S., M.S.
College of Dentistry,
University of Nebraska,
40th and Holdrege, Lincoln 68583
Stanton D. Harn, Ph.D.
1631 Brent Boulevard, Lincoln 68508
Lewis G. Nieberg, D.D.S.
1010 Piedmont Road, Lincoln 68510
Charles J. Vacanti, D.D.S.
892 North 68th Street, Omaha 68132

NEVADA
Lloyd B. Austin, D.D.S.
840 Eye Street, Sparks 89431

NEW HAMPSHIRE
Patricia Rossetti, D.M.D., M.S.N.
6 Birchwood Road, Windham 03087
Erich A. Witzel, D.D.S.
1 School Street, Lebanon 03766

NEW JERSEY
Milton B. Asbell, D.D.S.
Sussex Medical Center,
1001 North Kingshighway,
Cherry Hill 08034
Ronald Attanasio, D.D.S.
1902 Ocean Avenue, Belmar 07719
Michael P. Balbo, D.D.S.
New Jersey Dental School,
100 Bergen Street, Newark 07103
Stephen F. Bergen, D.D.S.
1 Colonial Woods Drive
West Orange 07052

THEODORE E. BOLDEN, D.D.S.
29 Montague Place, Montclair 07042
KURT BOMZE, D.D.S.
1910 Route 70 East,
Cherry Hill 08003
THOMAS M. DeSTEFANO, D.D.S.
2020 West Street, Union City 07087
DANIEL DiGIANCO, D.D.S., M.A.
Airport Plaza Shopping Center,
P.O. Box 36, Hazlet 07730
ARTHUR GRIEDER, D.D.S.
203 Godwin Avenue, Ridgewood 07450
DR. LEE ALBERT KRIMMER
475 Kinderkamack Road,
Oradell 07649
PERRY F. Levinsohn, D.D.S.
258 Hudson Avenue, Tenafly 07670
IRWIN D. Mandel, D.D.S.
60 Pine Drive, Cedar Grove 07009
RICHARD LEE MCCLELLAND, D.D.S.
9 Van deventer Avenue,
Princeton 08540
123 Prospect Street, Ridgewood 07450
DALE T. Smith, D.M.D.
3108 Woodhaven Drive,
Cinnaminson 08077
BRIAN P. Trava, D.D.S.
496 Bowers Lane,
Franklin Lakes 07417

NEW YORK
Louis B. Amyot, D.D.S.
9 North Church Street,
Schenectady 12305
E. David Appelbaum, D.M.D.
45 Allens Creek Road,
Rochester 14618
Lori A. Auster-Moore, D.D.S.
53 Barry Road, Scarsdale 10583
Robert A. Berkowitz, D.D.S.
c/o Angelopoulos, 17 Magnolia Drive,
Commack 11725
Dr. Bernard J. Biron
424 Madison Avenue #1407,
New York 10017
Frank Bisk, D.D.S.
2940 Mott Avenue,
Far Rockaway 11691
Melvin B. Borg, D.D.S., M.S.
52 South Main Street,
Spring Valley 10977
Dr. Jack M. Breuer
1117 Pleasantville Road, Box 1450,
Briarcliff Manor 10510
David L. Coffeen, Ph.D.
151 Edgars Lane, Box 151,
Hastings-on-Hudson 10706
Milton A. Schlein, D.D.S.
446 Main Street,
Center Moriches 11934
Carla H. Schissel, D.D.S.
17 Seaman Avenue #5H,
New York 10034
Murray Schwartz, D.D.S.
153 North Broadway, Nyack 10960
Robert D. Schweitzer, D.D.S.
745 Fifth Avenue #2607,
New York 10151
Joseph Serio, D.D.S.
246 Bedell Terrace,
West Hempstead 11552
Thomas O. Sweet, D.D.S.
5291 West Taft Road,
North Syracuse 13212
Dr. Isidore Teich
3530 Henry Hudson Parkway,
Bronx 10463
Dale C. Thames Jr., D.D.S.
USAF Clinic, Box 877,
APO New York 09057
Bernard P. Tillis, D.D.S., Editor
N.Y. State Dental Journal,
30 East 42nd Street, New York 10017
Roger W. Trifftshauser, D.D.S.
212 East Main Street #105,
Batavia 14020
Richard S. Vlock, D.D.S.
348 North Main Street,
Gloversville 12078
Stanley Weseley, D.D.S.
543 East 18th Street, Brooklyn 11226
Irving Yudkoff, D.D.S.
116 Central Park South #3,
New York 10019
Raymond F. Zambito, D.D.S., Ed.D.
Catholic Medical Center,
88-25 153rd Street, Jamaica 11432

NORTH CAROLINA
Arden G. Hegtveld, D.D.S.
Stratford Hills Apartments,
36-E Bolinwood Drive, Raleigh 27513
William J. Jasper, D.D.S., M.P.H.
2955 Rue Sans Famille, Raleigh 27607
Col. William A. Krantz, DC
515 Bloomfield Drive,
Fayetteville 28301
Robert J. Nelson, D.D.S.
109 Club Court, P.O. Box, 487,
Cape Carteret 28584
Kenneth V. Randolph, D.D.S.
418 Bost Road, Morganton 28655

NORTH DAKOTA
Larry K. Hoffman, D.D.S.
1209 Fifth Avenue S.E.,
Jamestown 58401

OHIO
Donald F. Bowers, D.D.S., M.S.D.
Ohio State College of Dentistry,
305 West 12th Avenue,
Columbus 43210
Jo A. Brandon, R.D.A.
2250 Charleston, Toledo 43613
Kent A. Caserta, D.D.S.
38459 Lakeshore Boulevard,
Willoughby 44094
Joseph W. Chester, D.D.S.
541 High Street N.E., Warren 44483
Peter C. Chu, D.D.S.
7058 Corporate Way, Dayton 45459
Kenneth M. Clemens, D.D.S.
2320 London Drive, Lima 45805
William C. Dew, D.D.S.
254 Croswell Road, Columbus 43214
Glenn W. Goist, D.D.S.
633 West Bagley Road, Berea 44017
Jack W. Gottschalk, D.D.S.
8040 Reading Road, Cincinnati 45237
Howard A. Hartman, D.D.S.
4187 Pearl Road, Cleveland 44109
Victor Kit, D.D.S.
8136 Eastdale Drive, Cincinnati 45230
James T. McCann, D.D.S.
8420 Mentor Avenue, Mentor 44060
Patrick S. Metro, D.D.S.
3865 Rocky River Drive,
Cleveland 44111
Elizabeth M. Robinson, D.D.S.
Case Western Reserve University,
School of Dentistry,
2123 Abington Road, Cleveland 44136
Eric R. Robinson, D.D.S.
Doctors Building #300,
3939 Monroe Street, Toledo 43606
Robert D. Tennant, D.D.S.
371 Lexington Avenue, Mansfield 44907
Daniel Verne, D.D.S.
Mount Sinai Medical Center,
University Circle, Cleveland 44106
Jack C. Weinrich, D.D.S.
150 Jefferson Street, Greenfield 45123

OKLAHOMA
G. Frans Currier, D.D.S., M.S.D.
3312 Caddo, Norman 73069
Larson R. Keso, D.D.S.
3501 Northwest 50th Street,
Oklahoma City 73112
OREGON
Douglas W. Anderson, D.M.D.
11655 Southwest Twelfth,
Beaverton 97005
J. Henry Clarke, D.M.D.
Oregon Health Sciences University,
611 S.W. Campus Drive, Portland 97201
Philip J. Rose, D.M.D.
P.O. Box 899, Clatskanie 97016
Geoffrey A. Stark, D.D.S.
2020 Stewart Parkway, Roseburg 97470
Susan Weinberg, D.M.D.
4670 Southwest Washington,
Beaverton 97005
James D. Windell, D.M.D.
135 Northwest 15th Street,
Newport 97365

PENNSYLVANIA
Herman M. Aqua, D.D.S.
487 Bennett Street, Luzerne 18709
Francis A. Castano, D.D.S.
110 East Third Street, Box 390,
Coudersport 16915
Theodore P. Croll, D.D.S.
East Street at North Main,
Doylestown 18901
Robert W. Failing, D.D.S.
100 West Evergreen Avenue,
Philadelphia 19118
Dr. Edward J. Forrest
418 Centennial Avenue,
Sewickley 15143
Jeffrey L. Goodis, D.M.D.
818 Walnut Street, Columbia 17512
Dr. William R. Harkins
Fulton Building, P.O. Box 176,
Osceola Mills 16666
Jerry J. Herschfeld, D.D.S.
3101 Bristol Road, Bensalem 19020
Dr. Robert W. Hilkene
1113 Bristol Pike, Andalusia 19020
Benedit K. Kimmelman, D.D.S.
1711 Pine Street, Philadelphia 19103
Steven M. Parrett, D.D.S.
543 Lincoln Way East,
Chambersburg 17201
Isaac Sissman, D.D.S.
10 Allegheny Center #805,
Pittsburgh 15212
John M. Whittcock Jr., M.S., Librarian
School of Dental Medicine,
University of Pennsylvania,
4001 Spruce Street, Philadelphia 19104

SOUTH CAROLINA
Lt. Cdr. Gordon M. Brown, DC
Quarters 231, Parris Island 29905
Allan D. Charles, Ph.D.
History Department,
University of South Carolina,
Union 29379
Edward L. Welsh, D.D.S., M.A.T.
Medical University of South Carolina,
171 Ashley Avenue, BSB Room 335-C,
Charleston 29425

SOUTH DAKOTA
Ronald D. Beck, D.D.S.
330 East Third Street,
Dell Rapids 57022
Donald C. Dendinger, D.D.S.
311 Walnut Street, Yankton 57078
Gayle V. Nelson, D.D.S.
2900 East 26th Street #200,
Sioux Falls 57103

TENNESSEE
E. Thomas Carney, D.D.S.
6500 Brownlee Drive, Nashville 37205
H. Franklin Miller, D.D.S.
843 Mount Moriah Drive,
Memphis 38117
Michael P. Tabor, D.D.S.
107 Maple Row Boulevard,
Hendersonville 37075

TEXAS
Tim Dobbins, D.D.S.
1440 MacArthur Boulevard,
Irving 75061
John Durtschi
405 Brees Boulevard,
San Antonio 78209
Robert W. Gamble, D.D.S.
824 Austin Avenue, Georgetown 78626
James L. Gutmann, D.D.S.
Baylor College of Dentistry,
3302 Gaston Avenue, Dallas 75246
Kenneth M. Hamlett Jr., D.D.S.
8617 Northwest Plaza Drive #104,
Dallas 75225
Norman O. Harris, D.D.S.
University of Texas Health Science
Center, 7703 Floyd Curl Drive,
San Antonio 78284
Darrell V. Hawkins Jr., D.D.S.
1250 Bay Area Boulevard,
Houston 77058
William C. Hurt, D.D.S.
Baylor College of Dentistry,
3302 Gaston Avenue, Dallas 75246
Foster Kidd, D.D.S.
  1420 Martin Luther King Boulevard, P.O. Box 15763, Dallas 75215
Kent G. Knudson, D.D.S.
  111 East Crestline Drive, San Antonio 78201
Robert D. Londereee Jr., D.D.S.
  7034 Descro Drive, Dallas 75225
Col. Bruce A. Matis, DC USAF
  8703 Bridington, San Antonio 78239
K. C. McCullough Jr., D.D.S.
  221 South Cedar Ridge, Duncanville 75116
M. Richard Miller, D.D.S.
  2501 McRae Boulevard, El Paso 79925
Mrs. Murray G. Musick
  7034 Lakeshore Drive, Dallas 75214
John V. Olson, D.D.S.
  2725 Pemberton Drive, Houston 77005
Barry E. Parker, D.M.D.
  6901 Corporate Drive #223, Houston 77036
Philip L. Plunk, D.D.S.
  203 South Coulter Drive, Amarillo 79106
Sue Ellen Richardson, D.D.S.
  700 Fannin Street #1660, Houston 77030
John D. Rugh, Ph.D.
  University of Texas Health Science Center, 7703 Floyd Curl Drive, San Antonio 78284
Bruce T. Sallen, D.M.D.
  2912 Wadsworth Way, Austin 78748
William A. Saunders, D.D.S.
  8226 Douglas Avenue #332, Dallas 75225
E. Wayne Simmons, D.M.D.
  The Crossroads #402, 1635 Northeast Loop, 410 San Antonio 78209
Fred D. Smith, D.D.S.
  Baylor College of Dentistry, 3302 Gaston Avenue, Dallas 75246
Robert G. Sproull, D.D.S.
  10912 Gary Player Drive, El Paso 79935
Robert D. Stevenson
  7026 Wurzbach #613, San Antonio 78240
James B. Summitt, D.D.S., M.S.
  13302 Cassia Way, San Antonio 78232
Heyl G. Tebo, D.D.S.
  5822 Queensloch, Houston 77096
John T. Weatherall, D.D.S.
  1124 Fourteenth Street North, Texas City 77590
Wilbur S. White Jr., D.D.S.
  2474 Broadway, P.O. Box 5453, Beaumont 77702
Douglas B. Willingham, D.D.S.
  Main Street at Thomas Arnold, P.O. Box 767, Salado 76571
Fred Zoch
  7110 Wurzbach #811, San Antonio 78240
Gloria Amsili
  502 Carleton Court, San Antonio 78212

VIRGINIA
Neal P. Davis, D.D.S., M.S.D.
  104 American Legion Road, Chesapeake 23321
Joseph M. Doherty, D.D.S., M.P.H.
  Virginia State Health Department, 109 Governor Street, Richmond 23219
Clement A. Farrell, D.D.S.
  1200 Forestwood Drive, McLean 22101
Thomas J. Fitzgerald, D.D.S.
  P.O. Box 552, South Hill 23970
Francis M. Foster, D.D.S.
  416 North First Street #A, Richmond 23219
Paul H. Keyes, D.D.S., M.S.
  International Health Foundation, 11800 Sunrise Valley Drive #832, Reston 22091
John W. Kish, D.D.S.
  7750 Gamid Drive, Springfield 22153
Jason R. Lewis, D.D.S.
  3605 Grove Avenue, Richmond 23221
Richard A. Miller, D.D.S.
  3604 Forest Drive, Alexandria 22302
A. Wright Pond, D.D.S.
  250 East Ellerslie Avenue, P.O. Box 156, Colonial Heights 23834
James R. Porter, C.D.T.
  4801 West Braddock Road #20, Alexandria 22311
J. Fuller Robinson Jr., D.D.S.
  Downtown Professional Building #907, 30 Franklin Road, Roanoke 24011
Nancy Kit Tucker, D.D.S.
  1404 Park Avenue, Richmond 23220
Marvin F. West, D.D.S.
  1118 Professional Drive #A, Williamsburg 23185

WASHINGTON
Col. David J. Bales
  5418 219th Avenue N.E., Redmond 98053
Darlene M. Chan, D.D.S.
  9236 California Avenue S.W. #B, Seattle 98136
James R. Gartrell, D.D.S., M.S.D.
1801 N.W. Market Street #205,
Seattle 98107

Allen Michael Kaplan, D.M.D.
515½ Queen Anne Avenue North,
Seattle 98101

Robert M. Monsen, D.D.S.
782 Sixth Avenue, Fox Island 98333

Michael E. Shannon, D.M.D.
181 Orchard Way, Richland 99352

Arnold Tamarin, D.D.S., M.S.D.
10339 Lakeshore Boulevard N.E.,
Seattle 98125

Philip Worthington, M.D.
616 152nd Avenue N.E.,
Redmond 98052

WISCONSIN

Robert E. Davies, D.D.S.
717 North East Avenue,
Waukesha 53186

Mr. Robert E. Doering
15245 Red Fox Lane,
Elm Grove 53122

James A. Englelander, D.D.S.
1547 North Farwell Avenue,
Milwaukee 53202

William Tracy Erbes, D.D.S.
101 Falls Road #500, Grafton 53024

WYOMING

William E. Willoughby, D.D.S.
207 West Second Avenue,
Cheyenne 82001

Members Outside of the United States

CANADA

Ian C. Bennett, D.D.S., Dean
Faculty of Dentistry,
Dalhousie University,
Halifax, Nova Scotia B3H 3J5

Dr. Charles C. Bourne
1414 Drummond St.
Montreal, Quebec H3G 1W1

Keeman Feng, D.D.S.
4474 West 12th Avenue,
Vancouver, British Columbia V6R 2R2

John H. Gryfe, D.D.S.
The Westlaw #209,
1920 Weston Road,
Weston, Ontario M9N 1W4

Christopher W. Herten-Greaven, D.D.S.
1414 Drummond Street #1123,
Montreal, Quebec H3G 1W1

Norton R. Lang, D.D.S.
5253 Boulevard Decarie #210,
Montreal, Quebec H3W 3C3

David C. Gabrihel, D.D.S.
10502 Highway "K", Franksville 53126

H. Daniel Green, D.D.S.
419 Pleasant Street, Beloit 53511

Peter H. Jacobsohn, D.D.S.
3819 West LeGrande Boulevard,
Mequon 53092

James J. Kestley, D.D.S.
3953 North 76th Street,
Milwaukee 53222

Edward F. Leone, D.D.S., M.S.
5726 National Avenue,
West Allis 53214

Gerard M. Schmidtke, D.D.S.
172 Christy Street, Amherst 54406

James W. Schwengel, D.D.S.
W64 N728 Washington Avenue,
P.O. Box 1, Cedarburg 53012

Carl J. Sibilski Jr., D.D.S.
7234 West Lincoln Avenue,
West Allis 53219

Perry G. Zeeb, D.D.S.
9324 Six Mile Road, Caledonia 53108

Edward J. Neill, D.D.S.
Principal Plaza #1044,
10303 Jasper Avenue,
Edmonton, Alberta T5J 3N6

C. Grace Petrikowski, D.D.S.
222 Elm Street #1412,
Toronto, Ontario M5T 1K5

Peter M. Pronych, D.D.S., M.S.
Halifax Professional Center #357,
5991 Spring Garden Road,
Halifax, Nova Scotia B3H 1Y6

Edward Shore, D.D.S.
6600 Trans-Canada Highway #805,
Pointe Claire, Quebec H9R 4S2

Gerald M. Silverman, D.D.S.
600 Tecumseh Road East #148,
Windsor, Ontario N8X 4X1

Oskar Sykora, D.D.S., Ph.D.
51 Bayview Road,
Halifax, Nova Scotia B3M 1N8
MEXICO
Dr. Jorge Fastlicht R.
Paseo De Las Palmas 745 #1005,
Mexico, D.F. 11000

AUSTRALIA
Dr. Sydney Levine
5 Upper Cliff Avenue,
Northbridge, New South Wales 2063
Dr. Richard R. Stephens
University of Queensland Dental
School, Turbot Street, Brisbane 4000
Dr. R. F. Stockwell
89 Davies Road #4,
Claremont, Western Australia 610

BELGIUM
Dr. H. Carlos Gysel
Camille-Huysmanslaan 69,
B-2020 Antwerp

BRAZIL
Prof. Dr. Com. Amedeo Bobbio
Rua Haddock Lobo 1310,
Apto 112, Sao Paulo

COLOMBIA
Dr. Efraim Ardila G.
Edificio Apolo #109, Bucaramanga
Dr. Gustavo Barrios M.
Avenida 116 (Pepe Sierra) 14A-36,
Apto 201, Bogota, D.E.

DENMARK
Dr. Leif Marvitz, Tandlaege-Klinikchef
Klampenborgvej 4, 2930 Klampenborg
Dr. Jens J. Pindborg
The Royal Dental College,
Blegdamsvej 3C, DK-2200, København

ENGLAND
Dr. Elisabeth Bennion
96 Pelham Road, London SW19
Dr. R. A. Cohen (Honorary)
8 Warwick New Road,
Leamington Spa, Warwick CV32 5JF
Dr. J. Archibald Donaldson (Honorary)
3 Third Close, East Molesey,
Surrey KT8 9PW
Dr. Stanley Gelbier
Saint Giles Hospital, Saint Giles Road,
London SE5 7RN
Dr. Gerald H. Leatherman (Honorary)
46 Devonshire Street #A,
London WN1 1LP
David W. Wright, M.A.
Science Museum, Exhibition Road,
South Kensington, London SW7 2DD

FRANCE
Dr. Jean Angot
17 Rue Clapeyron, 75008 Paris
Dr. Andre Besombes (Honorary)
17 Avenue Niel, Paris XVII
Dr. Francois-Charles Brunner
Musée UER des Sciences
Odontologiques, L'Université Claude
Bernard, Rue Guillaume Paradis,
69007 Lyon Cedex 2
Dr. Are C. Edwards
19 Boulevard de Montmorency,
75016 Paris
Dr. Jacques Foure
42 Rue de Chezy, 92220 Neuilly
Dr. Claude Rousseau
48 Rue Boissiere, 75116 Paris
Dr. Louis Vercere
5 Res La Roseraie, 78000 Versailles

GRECE
Dr. Gregory L. Polyzois
15 Meandrou Street, 11528 Athens
Prof. Dr. Alexander Tsoukanelis
1 Mourouri Street, 10674 Athens

INDIA
Dr. Prithvi Raval
Dental Health Center,
28 Vani Vilas Road,
Basavanagudi, Bangalore 560 004,
Karnataka

ITALY
Dr. Angelo Menconi
Via Leonardo Da Vinci 210,
Viareggio 55049
Prof. Placido Micheloni
Via Velletri 10, Roma 00198

JAPAN
Dr. Masayasu Hasegawa
5-3-2- Hongo, Bunkyo-ku, Tokyo 113
Dr. Tohru Maeda
Nippon Dental University,
1-9-20 Fujimi, Chiyodaku, Tokyo 102
Dr. Norimasa Moriyama
5-3-12 Hokusai, Bunkyo-ku, Tokyo 112
Dr. Kazuhiro Nagata
Nagata Dental Clinic, 509-2 Kyomachi,
Matsuzaka 515, Mie Prefecture
Dr. Sen Nakahara, Dean
Nippon Dental University,
1-8 Mamatara-cho, Niigata 951
Dr. Ichiro Takazoe
202-3-18-9 Ichigaya-Sunadohara,
Shinjuku-ku, Tokyo 162
NETHERLANDS
Dr. E. E. R. De Marr
Goetlijfstraat 112, 2596 RL den Haag
Dr. G. J. van Wiggen
Laan van Klarenbeek 137, Arnhem

NETHERLANDS ANTILLES
Dr. Rick Samuels
Mgr. Nieuwindstraat 6, San Nicolas, Aruba

NEW GUINEA
Dr. John D. Jago
Faculty of Medicine (Dentistry), University of Papua, P.O. Box 5623, Boroko, Papua

NIGERIA
Dr. Adeyemi Mosadomi
College of Medicine, University of Lagos, P.M.B. 12003, Lagos

NORWAY
Kai Hunstadbraten, Box 2, N-3341 Amot

SPAIN
Dr. Pedro Borja de Guzman (Honorary) Calle Lenor de Castro 2, Gandia, Valencia
Dr. Jose-Antonio Canut-Brusola
Grabador Estebe 10, Valencia 4
Dr. Francesc Casas-Botelle Rosellon 259, pral., 08008 Barcelona
Dr. Jose M. Pastor Tirant Lo Blanc 20, Valencia 13

SWEDEN
Dr. Otto C. Francke Linnegatan 90, 11526 Stockholm
Dr. Ake B. Lofgren (Honorary) Vidblicksgatan 1, 41257 Gothenburg
Dr. Christer C. N. Spangberg Kungsgatan 19, 63221 Eskilstuna

SWITZERLAND
Arthur-Jean Held, M.D., D.M.D. 32 Chemin du Petit-Sacconex, Case Postale 137, 1211 Geneva 19
Erich Geiser, D.M.D. Albisstrasse 10, CH-8134 Adliswil

VENEZUELA
Dr. Focion Febres-Cordero Apartado Postal 1,888, Caracas 1010-A

WEST GERMANY
Dr. Dr. Med. Christian Hepburn Asperger Strasse 48, 7140 Ludwigsburg
Prof. Dr. Walter Hoffmann-Axthelrn (Honorary) Schlierbergstrasse 84, 7800 Freiburg
Dr. Ulrich Lohse Bahnhofstrasse 29, D-2448 Burg auf Fehmarn
This Publication is Available in MICROFORM

FOR INFORMATION
WRITE:

University Microfilms International
Dept. F.A.
300 North Zeeb Road
Ann Arbor, MI 48106
U.S.A.

Dept. F.A.
18 Bedford Row
London, WC1R 4EJ
England