

# SWISS DENT

**Hans R. Mühlemann**  
Pioneer in the Research of the  
Oral Diseases Caries and Periodontitis  
His Life – His Teaching – His Work  
(\* August 26, 1917 – † June 1, 1997)

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di Odontologia  
e Stomatologia  
preventiva e terapeutica



2/18

H R Mühlemann



# « More Oral Health for More People »

**This was Prof. Dr. Hans Mühlemann's motto, and it was the basis upon which the Center of Dental Medicine at the University of Zurich, Switzerland, arranged and sponsored the «H.R. Mühlemann Symposium» on August 26, 2017 – to honor the legacy of a giant in dentistry.**

Hans R. Mühlemann was a pioneer in the scientific discipline of dental caries research. His momentous accomplishments in laboratory and clinical research, and the resulting enormous advances in public oral health that he and his team achieved during his 30-year tenure at the Zurich Dental Institute were expansively reviewed and lauded in recent editions of SWISS DENT.

After Hans Mühlemann and his team had effectively achieved their goals in the area of caries prevention, they progressed into the arena of restorative dentistry, seeking new pathways and techniques that revolutionized dental practice. It was Mühlemann who provided the guiding impulse in these endeavors. Under his leadership, Prof. Felix Lutz and his team in collaboration with COLTENE made significant breakthroughs in tooth-colored adhesive restorations for both anterior and posterior teeth. Their successes in these arenas make it possible still today for dentists to treat dental destruction with maximally conservative, functional and virtually invisible restorations, a fact that is welcomed by all dental patients.



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### IMPRINT 11

Special issue  
SWISS DENT 2/2018

### Hans R. Mühlemann On his 100<sup>th</sup> birthday

\* August 26, 1917 in St. Moritz GR  
† June 1, 1997 in Zurich, Switzerland



### Pioneer in the Research of the Oral Diseases Caries and Periodontitis

His Life – His Teaching – His Work

(Photo: Archives of Dr. med. dent.  
Herbert F. Wolf. CH-8134 Adliswil, Switzerland)

### SWISS DENT 2/2018

This edition is being published following the H. R. Mühlemann Symposium held in Zurich on August 26, 2017, celebrating Mühlemann's 100<sup>th</sup> birthday. He was the former Chairman of the Department of Preventive Dental Medicine, Periodontology and Cariology at the University of Zurich Dental Institute (1953 – 1983)

#### Organizer

Center for Dental Medicine  
University of Zurich  
Plattenstrasse 11, CH-8032 Zurich,  
Switzerland

#### Scientific Directors

Prof. Dr. med. dent. Thomas Attin  
Director, Clinic for Preventive Dental  
Medicine, Periodontology and Cario-  
logy and Chairman of the Center for  
Dental Medicine  
University of Zurich  
thomas.attin@zzm.uzh.ch

PD Dr. med. dent. Daniel Thoma  
Chief of the Continuing Education  
Commission  
Center for Dental Medicine  
University of Zurich  
daniel.thoma@zzm.uzh.ch



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In memory of a pioneer in medicine and dentistry, with appreciation for his service, teaching and research

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### SWISS DENT ISSUES IN REMEMBRANCE OF PROFESSOR HANS R. MÜHLEMANN

#### SWISS DENT 1/2017 (In German)

Hans R. Mühlemann  
Pionier der Erforschung der Mundkrankheiten Karies und Parodontitis

Zum 100. Geburtstag  
(\*26. August 1917 – †1. Juni 1997)

*This issue (in German) contains the contributions which Hans R. Mühlemann published (in German) in SWISS DENT in the years 1980 through 1985*

#### SWISS DENT 1/2018 (In German)

Hans R. Mühlemann  
Pionier der Erforschung der Mundkrankheiten Karies und Parodontitis

Leben – Lehre – Werk  
(\*26. August 1917 – †1. Juni 1997)

*In this issue (in German) former members of H. R. Mühlemann's team remember (in German) the time they spent with their teacher and mentor as coworkers.*

#### SWISS DENT 2/2018 (In English, the edition on hand)

Hans R. Mühlemann  
Pioneer in the Research of the Oral Diseases Caries and Periodontitis

His Life – His Teaching – His Work  
(\*August 26, 1917 – † June 1, 1997)

*This issue (in English) is a translation of the (German) issue SWISS DENT 1/2018.*

*Former members of H. R. Mühlemann's team remember (in English) the time they spent with their teacher and mentor as coworkers.*

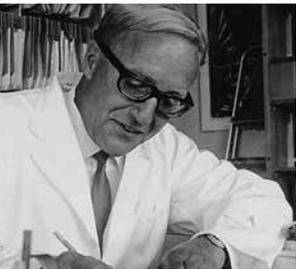
*English translation of the original German-language articles in this edition provided by Dr. Thomas Hassell, High Point, NC, U.S.A*

**All these three issues dedicated to Professor Hans R. Mühlemann may be downloaded from the publisher's website: [www.verlag-dr-felix-wuest.ch](http://www.verlag-dr-felix-wuest.ch)**

*Print copies are available while stocks last at CHF 50.– + postage.*

## Curaden on Professor Dr. Hans R. Mühlemann

**In remembrance of a research pioneer in two oral diseases - dental caries and periodontitis - and with recognition of his accomplishments in education and research. The family-oriented Swiss oral hygiene products company Curaden promotes Mühlemann's legacy and his heritage.**



Who was this man who, in the early 1960s, said «one can enjoy complete oral and dental health without dentists and without any sort of societal insurance program.» This quote stems from a Swiss specialist in the discipline of prevention, from Professor Hans R. Mühlemann, the pioneer in research into mankind's two most feared oral diseases, dental caries and periodontitis.

Mühlemann died on 1 June 1997 at the age of 80. He had a combative nature and was plain spoken. He associated himself with institutions and with basic premises, theories and concepts. For example, during a discussion published in the journal SWISS DENT in 1980, he criticized the recent meeting of the Swiss Society for Public Health, stating that they had completely ignored history and only argued over politics.

This stand was typical for Professor Mühlemann, who at that time stood only a few years from retirement, because he provided with definitive words a clear look at the recent developmental history of prophylaxis and its primary role in dental medicine, a circumstance that he himself participated in creating.

Together with four Swiss dental institutes and with the scientific research findings emanating from them, and their new preventive-oriented curricula, and with education boards and public health directors, and with professional dental organizations, school dental clinics and through numerous public exhibitions, and with many volunteers, Mühlemann produced pioneering research work for over 30 years. He proved that caries and periodontitis could be controlled and curtailed using inexpensive means and mechanisms.

Prevention, which Mühlemann propagated throughout his life's work, and which maintains today its enormous significance, was based upon four pillars: 1) Upon epidemiologic studies of caries and periodontitis incidence; 2) Upon the discovery of the caries-preventive effects of topical fluorides; 3) Upon the recognition that bacterial biofilm on the teeth is the obligate etiologic factors for both caries and periodontitis; and 4) Upon acceptance of the fact that unregulated sugar consumption is associated with oral and systemic diseases.

At Curaden, we are pushing Mühlemann's postulates forward with great vigor. We share, for example, his conviction that dental students must know how to brush their own teeth to render them perfectly clean. Only well-trained students, our future dentists, will be able to show the optimal pathways for their patients. We take these thoughts further: A properly selected and instructed tooth cleaning product can only exert its optimum effect if the patient is adequately and appropriately motivated.

We at Curaden achieve this via motivation and our teaching methods. We touch our customers – «We touch to teach» – and we have done this for more than twenty years with products like those from Curaprox, which are unsurpassed in terms of efficiency and patient acceptance.

Professor Hans Mühlemann was the source of the ideas and convictions that we propagate and live daily. Because just as dentists are more than «repairers,» the teeth and the oral cavity are not merely the repositories of disease but rather vibrant examples of good living and prosperity; the signals for a pleasing appearance and successful ascendance of the tower we call health.

Ueli Breitschmid, Curaden, Kriens

SWISS DENT 2/2018 – Special issue in remembrance of the 100<sup>th</sup> birthday of Hans R. Mühlemann (\*August 26, 1917 – † June 1, 1997)

# Hans R. Mühlemann

## Inspiration – Teacher – Example – Friend

Prof. em. Dr. med. dent. Klaus G. König, Nijmegen, The Netherlands

**Professor Hans R. Mühlemann was a fascinating personality with exceptional goal orientation, a comprehensive knowledge base, innovative thinking, professionalism, internationality and indefatigable passion**

**for oral health. All of his former companions who have contributed to this celebratory edition of SWISS DENT 1/2018 permit the reader to experience how they were inexorably drawn under his spell.**

The six characteristics of Hans Mühlemann noted in the introductory paragraph of this article were experienced and highly valued by all of the authors in this issue of SWISS DENT 1/2018, which is entitled «Companions remember.» He inspired all of us, all of us learned from him, he was an example for all of us, and the longer one knew him, the greater it was possible to feel connected to him as a friend. A comprehensive overview of his many academic and professional successes, and the growing number of sub-departments in the «Mühli-Emperorship» can be found in the chronology provided by Prof. Werner H. Mörmann in his lecture at the «H.R. Mühlemann Symposium» from 26 August 2017 and reproduced later in this journal. Here, his former companions describe Mühlemann as an inspiration, a teacher, an example, and a friend, and relate many personal stories and accounts. Interesting and sometimes confidential history will be found by the reader in the several sterling interviews published here.

For the writer of this introductory chapter, the question remains: How to depict young Mühlemann when his future life was still a blank page. Who in those early years inspired and motivated him, as a young physician and dentist? We must therefore weave the tapestry that depicts our hero's development from the beginning to his figurehead status in dental research on the European continent. Mühlemann's active career overlays three decades, and remains undisputed.

Many of Mühlemann's companions were not part of his early years as a departmental chairperson at the University of Zurich, getting to know him only later, when his insights and his professional stature were already consolidated. My attempt here is to attempt to reconstruct his «roots,» which led to his now well-acknowledged and enormous achievements, sometimes by way of indirect or alternative pathways.

### A consequential meeting

Following his education in Swiss universities, Mühlemann participated in practical, clinical medicine and dentistry, but these experiences did not teach him about scientific thinking or experimental planning; so, off to America! During his post-doctoral program at the University of Minnesota in Minneapolis, he met the endocrinologist Professor Franz Halberg. In 1952 – 1953, Halberg was younger than Mühlemann, but despite his young age Halberg was already very successful. Born in 1919 in Rumania and growing up in Austria, Halberg had studied in Vienna and in Innsbruck. He did his work

in clinical endocrinology at Harvard University Medical School on a grant from the World Health Organization (WHO), then moved in 1949 to the University of Minnesota, where he met a young Swiss physician and dentist who was thirsty for knowledge. They became friends, and Mühlemann was greatly inspired by Halberg.



Endocrinologist and «Mühli» inspiration Professor Franz Halberg, ca. 30 years older than during his visit in Zurich in 1957.



Mühli in his younger days

Halberg had made early on the significant discovery that daily recurrent rhythms were to some degree influenced endogenically, and could be synchronized and even changed by environmental influences, primarily by light (day-night change) and by nutrition. Retrospectively, Halberg described the then-prevalent stand of his findings in an extensive publication entitled «Transdisciplinary unifying implications of circadian findings in the 1950»; the term «transdisciplinary» meant that the day-night rhythm could influence biochemical processes in all areas of health and disease.

### The Nobel Prize in medicine

The close contacts with Halberg greatly influenced Mühlemann during his «discovery phase,» following his conventional theoretical and clinical education. This can be observed in his early studies in Zurich of «occlusal trauma,» the day-night changes in tooth mobility, and the synchronous rhythm of the cell division rate in periodontal tissues and the cornea (1, 2).

On 4 October 1957, the Russians launched Sputnik I into space. At the regular morning staff meeting, «Mühli» said «You just have to think – so high that it never comes down!» Sometime later, «Mühli's» friend Franz Halberg came for a visit in Zurich, and spent some days in Mühlemann's department. Even «Mühli's» young co-workers Marthaler, Rateitschak and König had the opportunity to experience the discussions between the two professors, and the famous visitor's charisma left a lasting impression. I remember

clearly Halberg saying that his research findings in the area of biorhythm and its guidance, especially in view of the coming manned space flight, would bring him the Nobel Prize. In fact, Halberg was twice nominated for the Nobel, in 1988 and in 1989, but as we now know this prize was awarded only in 2017, exactly 60 years after Halberg's vision in 1957, to three molecular biologists for their research on biorhythms. Franz Halberg remained active until the very end; he died at age 94, in June 2013. As the chairman of the Chronobiology Laboratories at the University of Minnesota, he was acknowledged in high esteem world-wide, but according to his close acquaintances he died disappointed: He had wanted the Nobel Prize for himself.

### Winner of the battle for liberation: Mühlemann and his team

The post-doctoral periodontology guru in Minnesota was the Austrian-American physician Helmut Zander. Like Mühlemann, he shared and embraced the ideas of Halberg. Both Zander and «Mühli» performed experimental studies of tooth mobility and occlusal trauma in attempts to discern the possible effect of biorhythm on cellular mitotic activity. «Mühli's» enthusiasm for this direction of research, however, waned after he returned to Switzerland to accept a professorship at the University of Zurich Dental Institute. Further clinical research demonstrated that systemic and above all endocrine diseases and their biorhythm-associated etiologies, while still of great importance, could not prevail over the importance of local pathogenic factors. Thanks to his healthy degree of self-criticism, and thanks to the critical input from his co-workers, Mühlemann came to the conclusion that the greatest progress in the direction of prevention of dental and oral diseases would emanate from scientific investigations of local etiologic factors.

It was the position of American researchers (the so-called «developmentalists») – since the epidemiologic studies in large cities in the 1940s – that fluoride could exert its anti-caries effect only if it was applied during the process of tooth development, via fluoridation of drinking water. Despite Mühlemann's principled conviction that American research was ahead of European efforts, intensive statistical evaluation of cumulative findings after years of water fluoridation in the U.S.A. led to the belief in a local (topical), post-eruptive effect of fluoride, which was Mühlemann's own vision, and which was stronger than the determinations of his American colleagues. These colleagues accepted – 40 years later! – the concept of topical fluoride as a caries-preventive measure that had been advocated by and demonstrated by Mühlemann and his Zurich team. Only in



Animal model specialist Ruedi Schmid in front of the first generation rat cages.

1980 was the topical effect of fluoride finally recognized world-wide as «evidenced-based.»

### Inspiration, Team Leader and Visionary

In 1956, Mühlemann began his search for the ideal fluoride compound for use in a dentifrice (3). He inspired chemist Hans Schmid (GABA, Inc., Basel, Switzerland) to synthesize more than 300 different compounds. All of these were exhaustively tested in «Mühli's» laboratories in the Dental Institute for effectiveness in lowering enamel solubility *in vitro*, then in rat *in vivo* models by animal model specialists Klaus König, Ruedi Schmid and Bruno Regolati, and finally in human clinical trials by epidemiologist Thomas Marthaler in a 7-year field study in school children.

This effort was a veritable parade of seamless interdisciplinary, unparalleled team effort. The primal force behind the development of an effective caries-preventive dentifrice were Mühlemann's self-confidence and his unshakable belief in the venture's success. The source of this self-confidence was his visionary view, with predictions that spanned decades. This special edition of SWISS DENT contains an interview with his daughter, Marietta, with impressive examples of this: He foresaw the world-wide use of mobile telephones long before the first Nokia model was produced. He prophesied the world of telecommunications technology at a time when nobody had even envisioned the personal computer.

### New Horizons

Mühlemann envisioned not only such major changes in our daily lives, but because of his flexibility, his future- and adventure-oriented imagination, he was able to quickly recognize new layers of development in his own area of specialization, periodontology. In



Hans Schmid, Basel. Professor Mühlemann and chemist Schmid met first in 1955 at the ORCA Congress in Geneva. Seated on the terrace of the Hotel du Rhône, the collaboration was cemented.

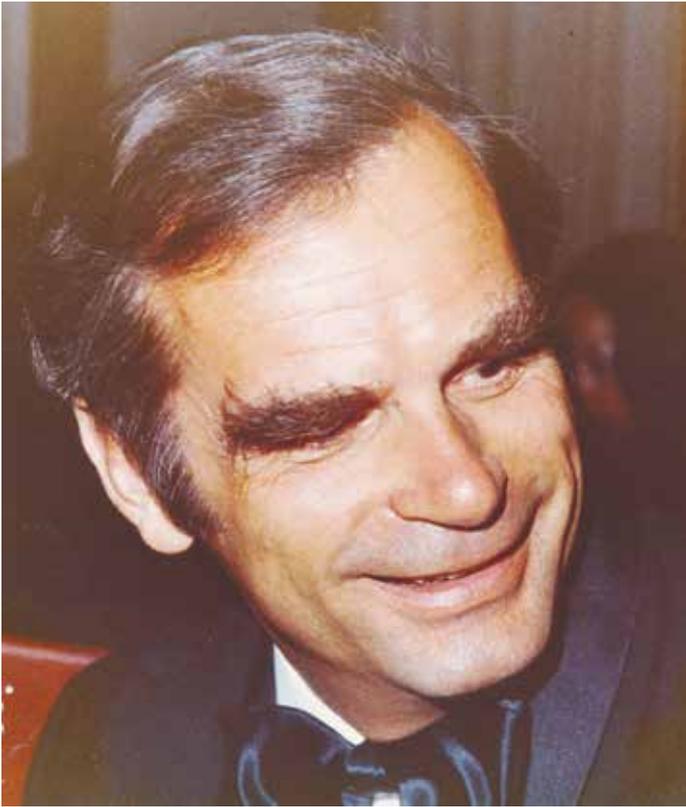


Ruedi Schmid

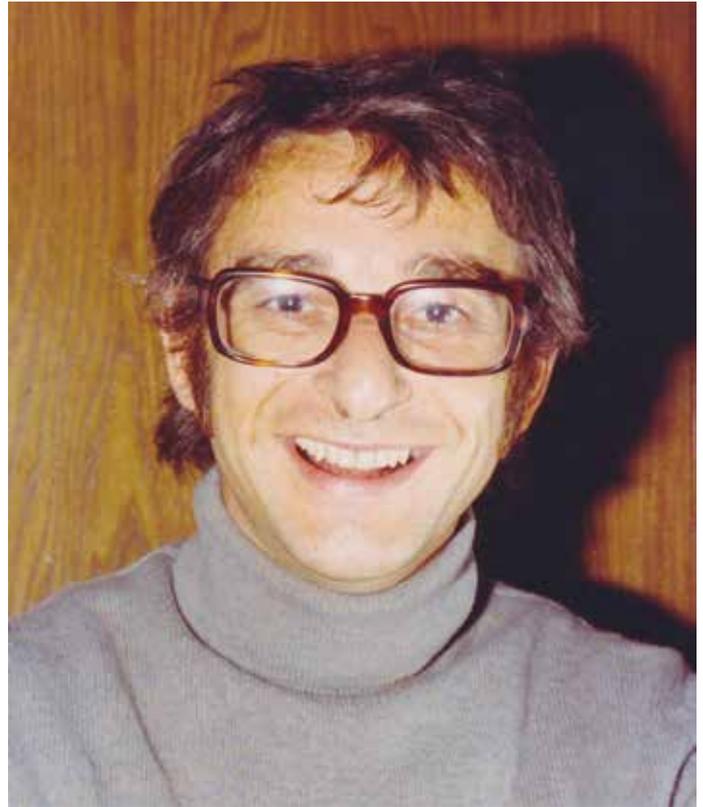
1960, in the fourth year of *Helvetica Odontologica Acta* (HOA), there appeared a remarkable paper not only from Mühlemann, the «Chef,» but also from Klaus Rateitschak and his partner Beatrix Wüst (4). The latter two individuals, based on their body of research work within the «Mühli»-Team, announced the end of «occlusal trauma» and «tooth mobility» as possible etiologic factors for periodontal diseases. Professional prophylaxis was recognized as the most effective mode leading to healing of periodontal diseases, and bacterial plaque became the focus as the primary etiologic factor in gingivitis, the precursor of periodontitis. This fit perfectly into the then-Scandinavian/American investigations of the early 1960s concerning the nature of dental plaque: It was no longer considered to be a deposition from salivary proteins, but rather a sticky and difficult to dissolve polysaccharide produced by bacteria.

At this point, Mühlemann came to a strategic decision: He would bring into his team an ETH-educated, highly motivated microbiologist, young Bernhard (he preferred the French version: «Bernard») Guggenheim. He had identified in addition to dextrans the equally insoluble mutan as the structural elements in dental plaque on the tooth surface at the gingival margin, and he offered many new ideas about etiology. In contrast to the use of then-current gnotobiotic methods for studying the stepwise accumulation of bacterial populations in germ-free rats, Guggenheim introduced «relative gnotobiosis» in rat studies. Using the antibiotic erythromycin, it was possible to suppress the rats' own oral microflora and then infect the animals with the bacterial species under study (5).

This was an additional, stronger impulse for «Mühli's» growing team. His colleagues and co-workers respected and applauded his growing stature in the international dental research community of scholars, right down to the youngest members of the «Mühli-Team.» Soon came also young Ruedi Schmid, the «rat king,»



Professor Klaus H. Rateitschak († 2002): Chief of Clinics in Mühlemann's department, and prominent professor of periodontology. Lead author of the world-wide acclaimed Color Atlas of Dental Medicine series. Including his own specialty of periodontology and top-class photography by his co-author Dr. Herbert F. Wolf. Photo 1974



Professor Bernhard Guggenheim († 2015): Internationally acknowledged pioneer in oral microbiology. Photo 1972



Professor Herbert E. Schroeder († 2012): Calculus researcher and renovator of research in oral structural biology of the oral hard tissues. Photo 1974



Dr. Herbert F. Wolf: Mühlemann's «photographer» and co-author of world-wide acclaimed dental textbooks and color atlases.



Professor Hans Graf († 2015). Photo 1974

as well as «Tomi» (Thomas) Marthaler, «Herbi» (Herbert F.) Wolf, Bruno Regolati, and the dental calculus specialists Ulrich Schneider, Werner Dossenbach and above all Hubert E. Schroeder (6).

### Oral Telemetry: Assessing the cariogenic potential of foodstuffs

An extraordinary research accomplishment was the ability to telemetrically measure the acidity of dental plaque. It had been known for a long time that contact with sugar was followed very rapidly by a very high concentration of cariogenic acid. In view of the high sugar intake that followed WWII, and the frightening level of carious destruction in children, there was an almost emergency need for research in this arena. Mühlemann responded to this need at the end of the 1950s by challenging his doctoral students Hans Graf and Dieter Neff to conduct *in vivo* studies of acid formation within dental plaque using miniature pH electrodes. These were tentative first steps, which were not followed up on by Graf after he left Zurich for a departmental chairmanship at the University of Bern. In that interim, radiotelemetry of interdental plaque pH was pursued in «Mühli's» Zurich labs by Jan DeBoever, and then by Thomas Hassell (1970-1973), who also developed methods for telemetric measurement of intraoral fluoride, calcium and temperature. One of Hassell's graduate students, Thomas Imfeld, then took intraoral pH telemetry to new levels using modern instruments and techniques as early as 1975, employing the talents of electronics engineer Thomas Reich. Interdental pH telemetry achieved a new niveau, which resulted in the method being recognized as the main source for determining whether various foodstuffs and drinks could be marketed as «safe for teeth» (7).



Left: Thomas Imfeld; «Mühli» called him Thomfeld. Right: Thomas Reich; «Mühli» called him Tomreich. Two pages from a photo-collage that was typical for Mühli (1976).





From left: Marianne Marthaler, Thomas M. Marthaler, Klaus G. König, Thomas Imfeld, photographed by Carola Imfeld in Restaurant Cantinetta Antinori, Zurich.



Felix Wüst at about age 40. He founded several professional journals in 1979. The first edition of SWISS DENT appeared in 1980. Photo 1980.

Imfeld not only studied sugar, but also the many sugar substitutes and high-molecular carbohydrates, and in addition all characteristics of nutritive substances that could be considered of low cariogenicity. In his well-known book «Identification of Low Caries Risk Dietary Components» (Karger Publishers, Basel, 1983), he provides a comprehensive literature review. His work led to a categorization of foodstuff components that could be regarded as «sugar-free» or «safe for teeth,» which has had a significant impact on the improvement of dental health and systemic health. With and following Imfeld's contributions, not only was a highpoint in the Mühlemann era achieved, there was a guaranteed level of foodstuff quality for two decades following «Mühli's» retirement, which continues to this day.

### Non-professional supportive pillars

Behind a specialist-oriented organization such as Mühlemann's department with its broad spectrum team of dedicated colleagues stood a group of individuals who offered continuous and continual support for the overall effort. As representatives of this cadre, I take this closing opportunity to introduce, identify and laud two individuals who are exemplary in this regard.

The first is Marianne Marthaler-Müller, the sterling example of a Mühlemann secretary who, despite the fact that she worked exclusively for «Mühli», held the entire department together with her discrete but magical charm. The second person who contributed extraordinarily to Professor Mühlemann is Dr. Felix Wüst, the Editor-in Chief of many and various medical and professional journals since the 1970s. Dr. Wüst was enraptured by our planning of a big 100th birthday party for Hans Mühlemann; he published in 1980 a grand interview with «Mühli» upon the founding of the new professional journal SWISS DENT. Even up until today, Felix Wüst has

devoted himself to the many scientific and personal contributions made by Hans Mühlemann over the decades. He made a significant contribution by editing and publishing the January 2017 edition of SWISS DENT, which represented a testament to his enthusiasm for Mühlemann's goals and successes over the years. That edition presented a complete and fully authentic compilation of Mühlemann's contributions to SWISS DENT and to dentistry international. This January 2018 issue of SWISS DENT offers testaments to Mühlemann from his huge cadre of former colleagues world-wide.

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*Additional publications throughout the publication history of Helvetica Odontologica Acta (HOA), the reprint archives of the University of Zurich Dental Institute and representative monographs and international professional journals.*

### Contact

Prof. em. Dr. med. dent. Klaus G. König  
k.konig@kpnmail.nl

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# ORALE MEDIZIN FÜR DEN ALTERNDEN MENSCHEN

## Altern – Multimorbidität – Schmerz und Angst

### SWISS DENT 2/17

#### SWISS DENT 2/2017

#### Zahnärztliche Kernkompetenzen für die Zukunft



Vorträge des Symposiums zum  
60. Geburtstag von  
Prof. Dr. Christian E. Besimo

Universitätsspital Basel  
12. Mai 2017

#### EDITORIAL

Zahnärztliche Kernkompetenzen  
für die Zukunft

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Nicola U. Zitzmann, PhD, Basel

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Biberstein AG

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Zum 60. Geburtstag von

Prof. Dr. med. dent. Christian E. Besimo  
Laudatio

– Prof. Dr. med. dent.

Nicola U. Zitzmann, PhD, Basel

#### ANHANG

Eine Orale Medizin für den alternden Men-  
schen

20 Jahre Basler Curriculum

– Prof. Dr. med. dent.

Christian E. Besimo, Brunnen

– Prof. Dr. med. dent.

Nicola U. Zitzmann, PhD, Basel

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SWISS DENT 2/2018 – Special issue in remembrance of the 100<sup>th</sup> birthday of Hans R. Mühlemann (\*August 26, 1917 – † June 1, 1997)

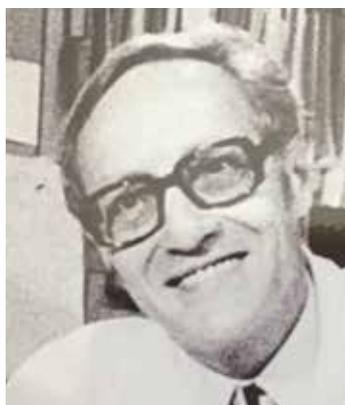
# Hans R. Mühlemann – His Life and His Work

Prof. em. Dr. med. dent. Werner H. Mörmann, Zürich (\*\*)

---

Hans R. Mühlemann

Pioneer in the Research  
of the Oral Diseases Caries  
and Periodonitis



On his 100<sup>th</sup> birthday  
\* August 26, 1917 in St. Moritz GR  
† Juni 1, 1997 in Zurich

(Photo: Archives of Dr. med. dent.  
Herbert F. Wolf, CH-8134 Adliswil, Switzerland)

---

***Dear Dean Weber, dear colleagues,  
dear ladies and gentlemen:***

***I am happy and pleased to greet  
you this morning, to celebrate  
with you the 100<sup>th</sup> birthday of  
Professor Hans R. Mühlemann,  
and to share with you some of the  
details of his life and his work. As  
a former student and co-worker  
of Professor Mühlemann from  
1970 up until his retirement in  
1983, I believe that I possess an  
authentic connection to the  
Mühlemann epoch, and it is an  
honor for me to present some of  
my memories of him at this  
symposium. I am grateful to Pro-  
fessor Thomas Attin for his kind  
invitation.***

---

(\*\*) Lecture presented at the «H. R. Mühlemann Symposium», organized by the Center for Dental Medicine of the University of Zurich, on Mühlemann's 100<sup>th</sup> birthday, August 26, 2017.



Figure 1

As you can see here, I met Professor Mühlemann in his office in October 1970, as I introduced myself to him as a newly hired Assistant. He radiated competence, power and style. «One thing you have to know,» he said to me, «We don't need any geniuses around here.» I understood his expectation that I would integrate myself seamlessly into his team, and I felt that I was in the right place. His spirit of enterprise and his verve are obvious from his signature, below left. His then-heavy burden is visible in his left hand, which holds a cigarette. Later, he reduced his tobacco use from three packs a day to zero, «cold turkey»; after that, smoking in the department was «out» for his co-workers.

## *Personal information\**

*Hans Rudolf Mühlemann*

**Born:** *August 26, 1917 in St. Moritz, Switzerland*  
*Father a bank director,*  
*Citizen of Zurich and Bönigen (Bern)*  
*Mother Elsa from Kandergrund (Bern)*

**Education:** *Grammar school, St. Moritz; High school, Schiers*

**Youthful interests:** *latest technology, astronautics, sports*

**Health:** *skiing accident, life-long pain when walking*

**Marriage:** *November 23, 1948 to Maria Ruth Stoller*

**Children:** *Daughter Marietta, born 1957; three grandchildren*

*\* From personal communication with Marietta Jung-Mühlemann*

Figure 2

Hans R. Mühlemann was born on August 26, 1917, in St. Moritz, Switzerland. His father Hans Mühlemann was a bank director in St. Moritz, and a citizen of St. Moritz and of Bönigen, near Interlaken in Canton Bern. His mother, Elsa, born Müller, was the daughter of a textile industry family in Kandergrund, also in Canton Bern. He attended grammar school in St. Moritz; for high school, he had to go to Schiers in Prättigau because there was no high school in St. Moritz. During all of his formative years, he was always interested in the latest technologies, he wanted to be an astronaut, and he participated in skiing and ski jumping, which clearly demanded intrepidity. Unfortunately, he suffered a serious skiing accident while in high school and was left with a hip injury that plagued him all his life and made even walking painful. In 1948, as he was just beginning his dental/medical career, he married Maria Stoller from Zurich. His daughter Marietta was born in 1957, and later as Mrs. Jung-Mühlemann gave him three grandchildren, which he was able to enjoy at the end of his career.

# Education and positions held

Hans Rudolf Mühlemann

(1)

*Studies at Universities of Geneva, Bern and Zurich*

*University of Zurich and in the USA*

1942 received **Dr. med. dent. degree**

1946 received **Dr. med. degree**

1946-51 **Oberassistent**, Department of Oral Surgery & Department of Orthodontics

1951 **Privatdozent**, "Physiologic and pathologic tooth mobility"

1952 **University of Illinois, radiobiology**  
**Oak Ridge National Lab., radioactive isotopes**

1953 **University of Minnesota, clinical periodontology**  
**Primate animal models**



Figure 3

This is a photo of the young Hans Mühlemann as a 22-year-old student of dentistry and medicine at the Universities of Geneva, Bern and Zurich. He graduated as a dentist in 1942, and as a physician in 1946. Both degrees were awarded by the University of Zurich. From 1946 through 1951, he was *Oberassistent* in the Departments of Oral Surgery and Orthodontics in the Dental Institute, University of Zurich. In the field of orthodontics, he invented and developed the «propulsor,» a device for the treatment of dento-alveolar protrusion of the maxilla. In 1951, he inaugurated his academic career based on his research on «The Physiologic and Pathologic Mobility of the Teeth.» He fabricated a special device for the measurement of tooth mobility.

During 1952 and 1953, he expanded his knowledge in the realm of dental medical research as he participated in programs in universities and research centers in the U.S.A., first at the University of Illinois in the area of radiobiology for tumor therapy, and later at the Oak Ridge National Laboratory, in Tennessee, with the use of radioactive isotopes for marking and identifying tissues. Finally, he traversed training at the University of Minnesota, where he sought new knowledge of clinical periodontology and research possibilities using primate animal model systems.

**Education and positions held**  
(2)

*Hans Rudolf Mühlemann*

**1953** *Professor (Extraordinarius)  
Chairman,  
Department of Conservative Dentistry  
and Periodontology, including histology*

**1963-66** *Director, Dental Institute, University of Zurich*

**1970** *Professor (Ordinarius)*

**1972-74** *Chairman of the Professor's Collegium*

**1977** *Departmental name change to:  
Department of Cariology, Periodontology and  
Preventive Dental Medicine*

**1983** *Retirement*

*Zürichbergstrasse 4/8*  
1961

*Plattenstrasse 11, 1962*

Figure 4

On the basis of his excellent education and exceptional capabilities, in 1953 he was named as a professor at the University of Zurich, and was called to the position of Chairman of the Department for Conservative Dentistry and Periodontology, including histology. Up until 1961, this department was located in the old institute on Zürichbergstrasse 4-8, as shown in the upper photo (right). His portrait on the left depicts him in 1963 as he assumed the position of Director of the Dental Institute of the University of Zurich, which was housed in the new high-rise tower at Plattenstrasse 11 (photo, below right); this move permitted him to expand his department.

The 30-year period of research activity from 1953 until his retirement in 1983 was characterized by his unrelenting pursuit of a broad range of ideas and his limitless enthusiasm for research in dental medicine. In 1970, he was named an «ordentlicher Professor,» and in 1972 – 1974 he served as chairman of the Professorial Collegium. In 1977, his department was re-named as the «Department of Cariology, Periodontology and Preventive Dental Medicine.» In 1983 Hans Mühlemann was honored with an *emeritus* professorship at the University of Zurich, and departed academic life.

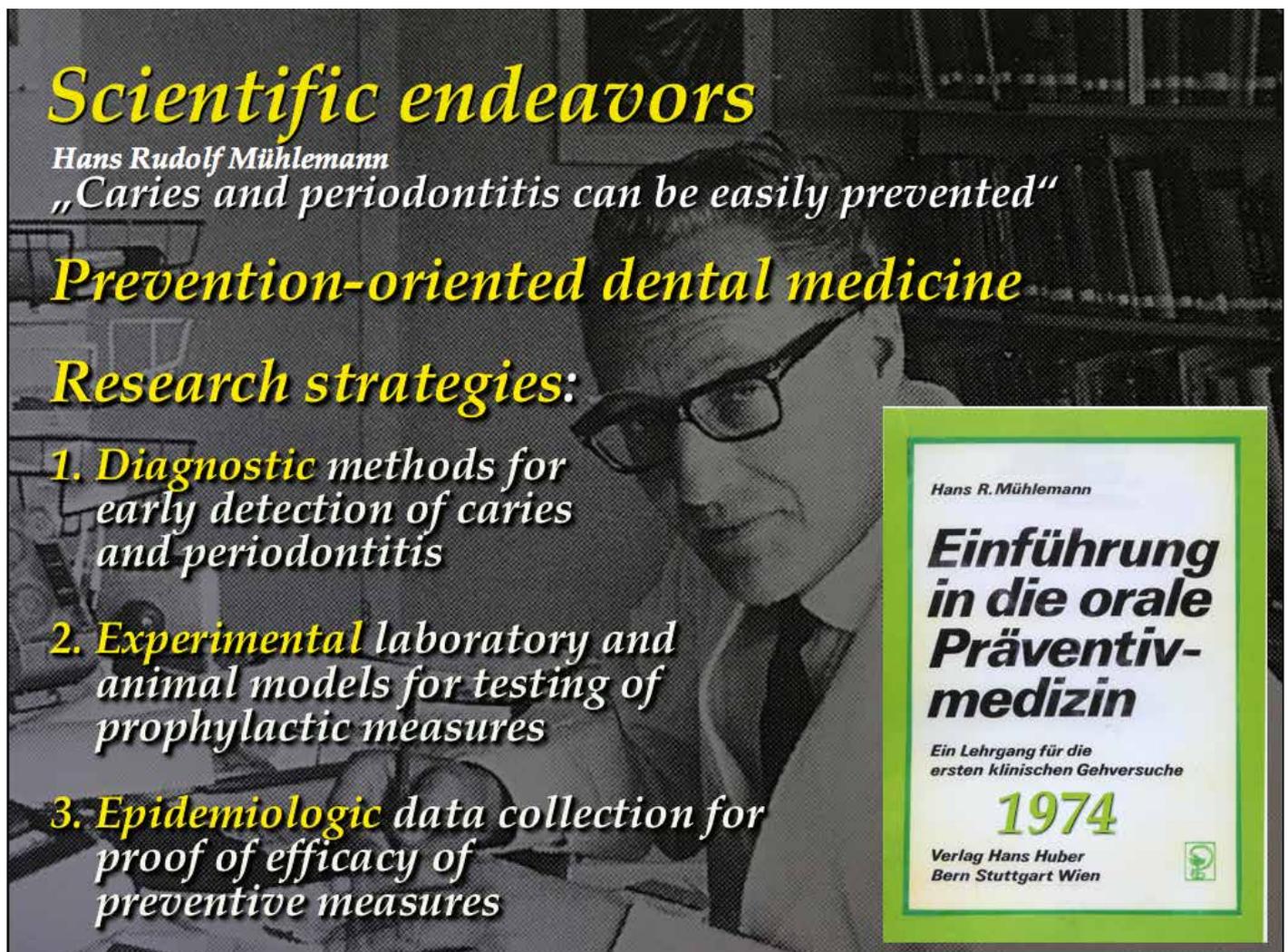


Figure 5

H. R. Mühlemann recognized that the constantly regenerating bacterial colonization of the teeth and gingiva represented the most important and virulent etiology for dental caries and periodontitis, and he realized that these diseases could be prevented to a great degree by scrupulous oral hygiene and other preventive measures. It is from this realization that his scientific endeavors were targeted toward the goal of prevention-oriented dental medicine. He established a broad research strategy for the creation of oral hygiene aids and pathways to promote and facilitate the health of all oral cavity structures. The knowledge gleaned from his research led to the publication of his textbook «Introduction to Oral Preventive Medicine,» by Hans Huber Publishers (1974).

His research strategy consisting of three essential elements emanated clearly and directly from his book:

1. The first element was the creation of diagnostic methods for early detection and assessment. Early identification of the disease(s) allows us to establish a prevention regimen not only for each individual patient, but for entire populations.
2. The second element was the establishment of experimental laboratory and animal models. These permit testing of preventive measures under controlled conditions and in a short time span.
3. The third element was the collection of epidemiologic data. Such data would make it possible to ascertain the efficacy of prophylactic measures in diverse population groups or in the entire population of a country.

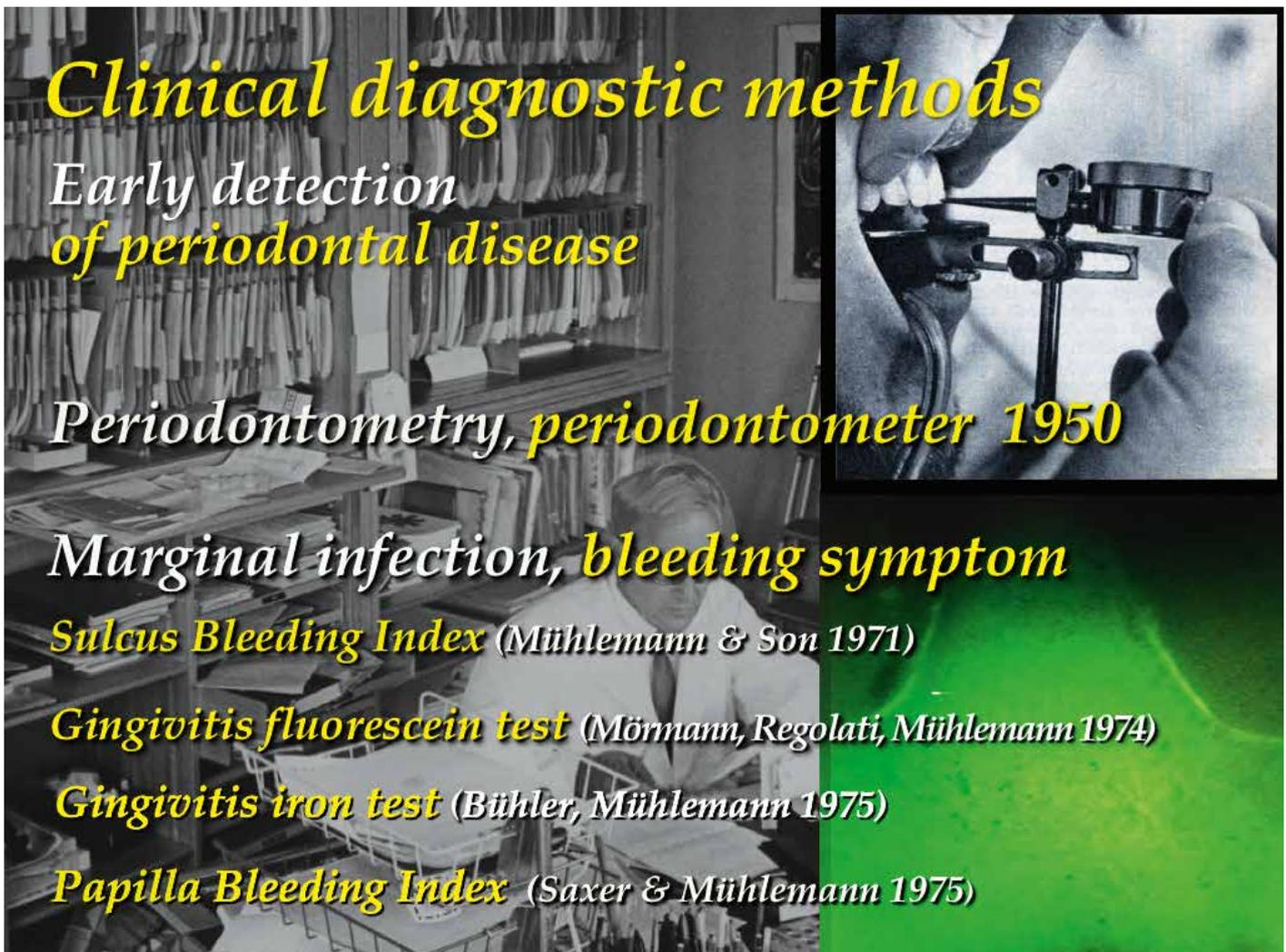


Figure 6

Mühlemann searched for clinical diagnostic methods for early identification of periodontal disease. The measurement of tooth mobility using his periodontometer is depicted above, right. Unfortunately, this technique proved too cumbersome and time consuming for a dental practice-oriented effort, and was not sensitive enough.

The earliest manifestation of initial disease of the periodontium – gingivitis resulting from marginal infection – could not be detected. Subsequent to this realization, Mühlemann developed additional methods for examining individual patients and for screening large groups for marginal periodontal inflammation, as indicated here.

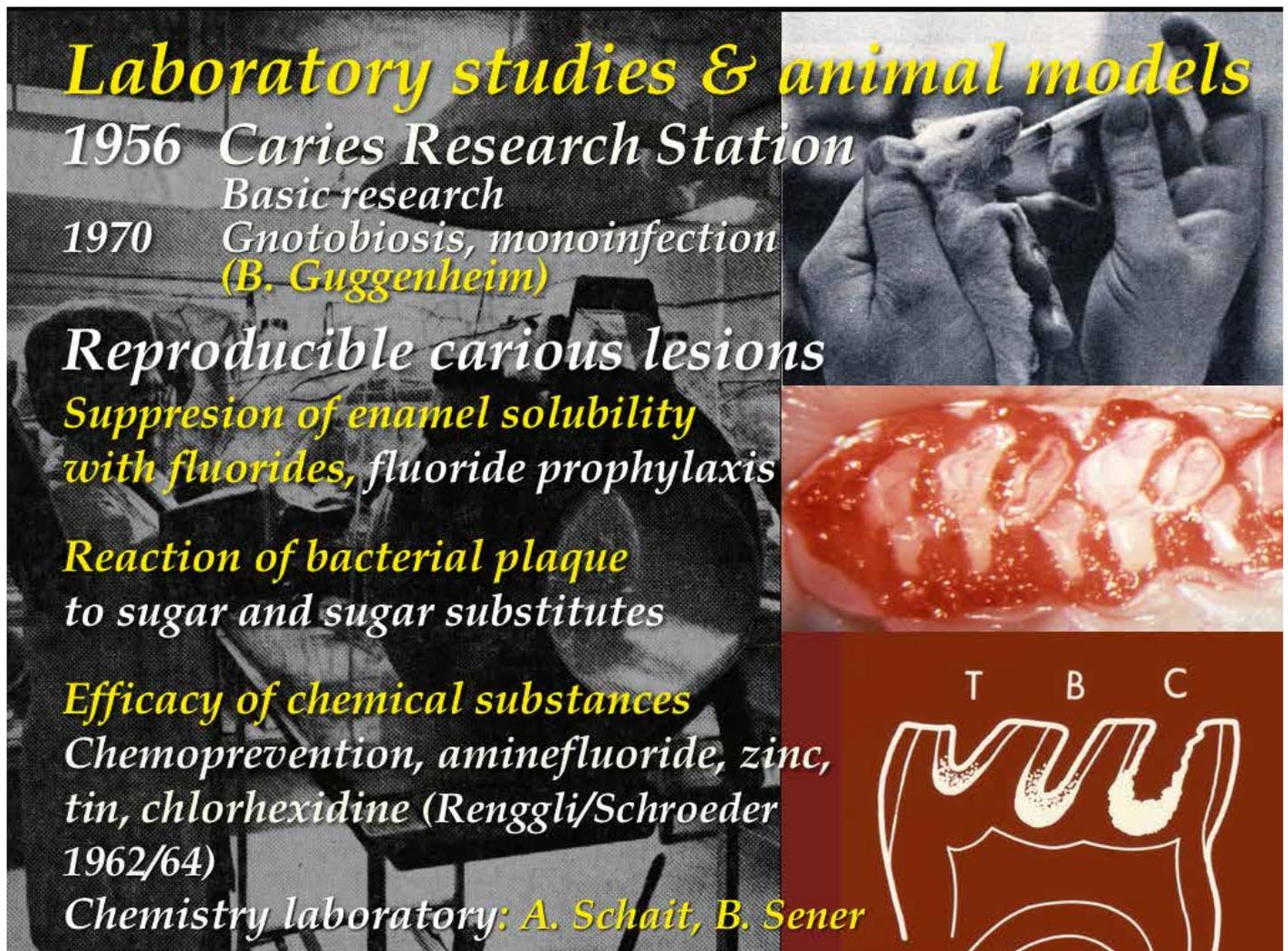


Figure 7

In the arena of dental caries research, Mühlemann introduced experimental laboratory and animal models.

He founded the Caries Research Laboratory in 1956, in which laboratory rats inoculated with, for example, *Streptococcus mutans*, could be studied, as shown above, right. In a period of three weeks, it was possible to reproducibly elicit carious lesions in the fissures of rat molars. On the right (center), one can observe the red-stained bacterial colonizations. After sacrificing the animals, the fissure caries could be histologically evaluated, and quantified with regard to their extent/severity, as shown in the schematic (below, right).

The fluoride content of the enamel surface was determined, and its effect on the incidence of fissure caries could be quantitated. The reaction of the dental plaque to sugars, as well as the cariogenicity of various foodstuffs and drinks could be ascertained and quantitated.

The efficacy of chemical substances as potential inhibitors of bacterial colonization, e.g., chlorhexidine, was the subject of early research in the 1960s by Dr. Heinz Renggli and Dr. Hubert Schroeder. Later, combinations of potentially preventive compounds were also tested. The chemistry laboratory within the department, headed by Dr. Angela Schait and subsequently after 1981 by Dr. Beatrice Sener, provided basic science support for the clinical research.

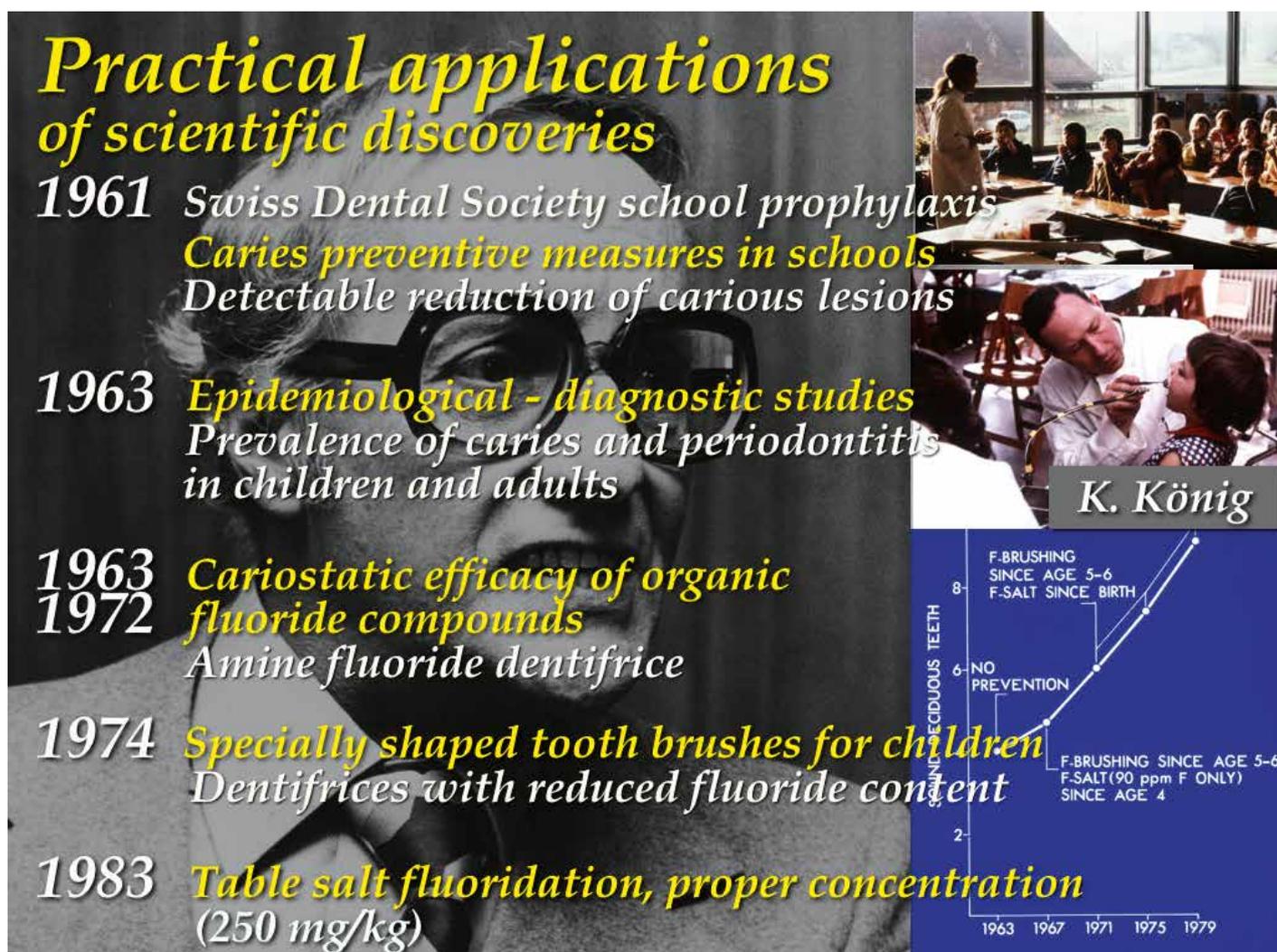


Figure 8

H.R. Mühlemann was completely committed to transferring new scientific knowledge as quickly as possible to the population at large.

In this picture, above-right, one can observe school children brushing their teeth with fluoride-containing dentifrice, under the supervision of a teacher or dental hygiene assistant.

In 1961, the Swiss Dental Society – with support from Mühlemann – introduced school dental prophylaxis, and announced that all school children in Switzerland must undergo an epidemiological dental examination every four years. The photo on the right (middle), shows Dr. Klaus König examining school children under the auspices of this new regulation.

By 1963, the cariostatic efficacy of the amine fluoride-containing dentifrice *elmex*<sup>®</sup> was recognized and approved by the Swiss federal authorities, and was released for public consumption in 1972. The supervised tooth brushing with fluoride-containing dentifrice from ages 5 through 6, and the use of fluoridated table salt from age 4 led immediately to a steep increase in the number of healthy deciduous teeth, as shown here in the blue diagram. Since that time, the use of fluoride-containing dentifrices and table salt fluoridation at a concentration of 250 mg/kg have become the veritable pillars of caries prophylaxis, and have led to a significant reduction in caries incidence in young persons and adults, and to an overall improvement of oral health in Switzerland.

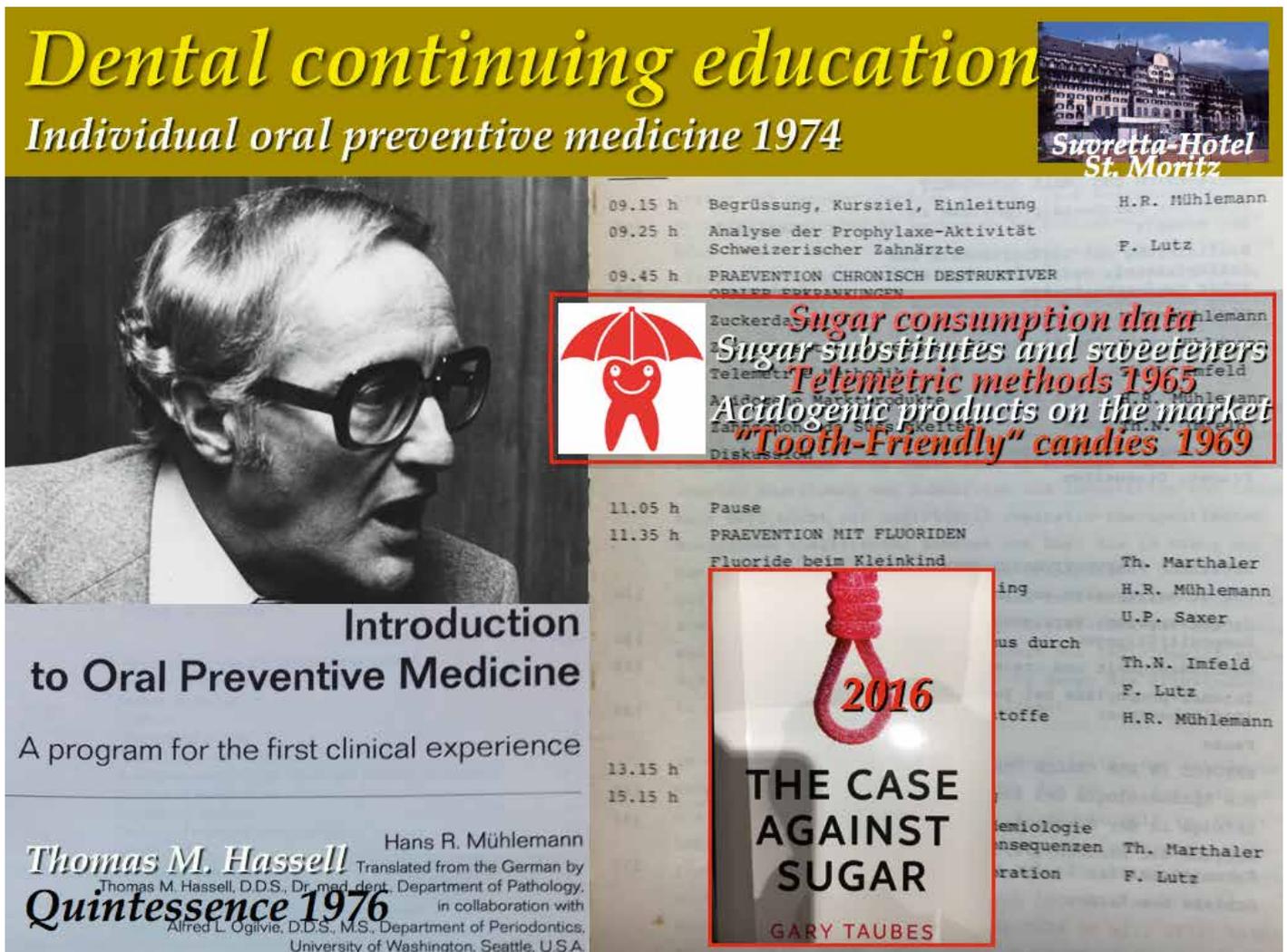


Figure 9

The continuing education course «Individual Oral Preventive Medicine» presented at the Suvretta Hotel in St. Moritz was organized and established by H.R. Mühlemann and Dr. Alfred Egli.

Ever since the establishment of the Caries Research Station, Mühlemann had fought against the excessive, and sometimes deceptive, consumption of sugar-containing foodstuffs and drinks, and for research and implementation of sugar substitutes, as depicted in this picture (above, left). His co-worker and student, Professor Thomas Hassell (U.S.A.) translated his book «Introduction to Oral Preventive Medicine» from German into English, as you see below (left). Mühlemann’s main theme – «sugar» – is encircled in red: «Sugar use data, sugar substitutes and artificial sweeteners, acidogenic market products, ‘tooth-friendly’ sweets.»

Mühlemann introduced the telemetric methods for the first time in 1965, in collaboration with Dr. Hans Graf. Using this technique, it was possible to precisely determine which sweetened foodstuffs were damaging to teeth, and which were «tooth-friendly» or «safe for teeth.» The term «safe for teeth» was proselytized by Mühlemann. The umbrella symbol above the healthy tooth has, since then, been the signet for «tooth friendly» products. Today, sugar in combination with increasing obesity and general systemic diseases in the population stands in the cross-fire in popular scientific publications, for example in the 2016 book «The Case Against Sugar.»

# The teacher and clinician

1954 First lectures on periodontology

1961 First clinical periodontology course

- Oral structural biology (Schroeder)
- Oral microbiology (Guggenheim)
- Preventive dental medicine (Marthaler)
- Pathophysiology (Mühlemann)

„Klappertest“  
to detect premature  
occlusal contacts

1961 First dental hygienist (B. Benson)

1972 First Swiss Dental Hygiene School (DHZH)

1973 DHZH opens (U.P. Saxer)

1980 Education of Prophylaxis-Assistants

## Practical Diagnosis

- Brief general medical and specific history
- Determination of oral hygiene (plaque, calculus) patient compliance
- Limited functional analyses

Hans R. Mühlemann · Klaus H. Rateitschak  
Heinz H. Renggli  
**Parodontologie**  
Gesundes Parodont,  
Ätiologie, Diagnostik, Prophylaxe und Therapie  
parodontaler Erkrankungen  
112 Abbildungen

Reine Liebe  
Werner Nörmann  
eine kleine Erinnerung  
an die Zürcher -  
Parodontologie

Clay

1975



Georg Thieme Verlag Stuttgart 1975

Figure 10

As a teacher, H.R. Mühlemann introduced in 1954 the first lectures on periodontology; in 1961, the first clinical periodontology course was presented to students at the University of Zurich. In the 1960s, the first courses in oral structural biology and microbiology were established, and in the 1970s there was an effort toward the initiation of the expansion of clinical studies in oral preventive medicine, highlighted by Mühlemann's lectures on pathophysiology.

This photo depicts Mühlemann administering the manually-guided assessment test («Klapper Test») for the elucidation of premature dental contacts. This represents a segment of the practical diagnosis portion of his book «Periodontology,» which was published in 1975.

In that book, Mühlemann first enunciated the concept that «dental hygiene» is the key to success in periodontal therapy. It was in 1961 that the first Dental Hygienist – Barbara Benson (U.S.A.) – practiced the profession in Switzerland, in Mühlemann's private practice. Mühlemann supported the foundation of the first Dental Hygiene School in Switzerland, in Zurich in 1972, which was directed by Prof. Ulrich P. Saxer. He later supported the education and training of «Prophylaxis Assistants,» in order to insure the principle of the dental hygiene «recall.»

## The "Chef" celebrates and is celebrated 1975 H.R. Mühlemann and his co-workers/colleagues



### Birthday



### Christmas

Figure 11

Professor Mühlemann always maintained open and cordial relationships with his co-workers and colleagues in research and education, and he frequently sponsored informal social gatherings. When we spoke of him, we called him «Mühli.» At Christmas time, we always gave him a small gift, and that made him happy.

On such occasions, the mood was joyful and festive! From all of the individuals shown in this illustration, I would point out Dr. Angela Schait, chemist (above, left, in the red dress), who was intimately involved in the development of the amine fluoride-containing dentifrice, *elmex*®.

# Scientific publications

Hans Rudolf Mühlemann

>400 publications, 14 advanced degrees, ca. 190 dissertations (Lutz F. 1995)  
H-Factor 28 (Attin Th. 2017)

## Colleagues in various disciplines

- Chronobiology, tooth mobility, gingival diseases  
Clinical periodontology, occlusion:  
**Rateitschak, Renggli, Saxer, Germann, Curilovic.**
- Experimental caries research:  
**König, Marthaler, Regolati, Schmid**
- pH telemetry: **Graf, Hirzel, DeBoever, Hassell, Imfeld**
- Development of amine fluorides: **Schait**
- Experimental calculus studies: **Schroeder**
- Individual, collective and semi-collective prophylaxis: **König, Marthaler**
- Caries preventive programs in the Canton of Zurich: **Marthaler**
- Caries epidemiology: **Marthaler, Menghini**

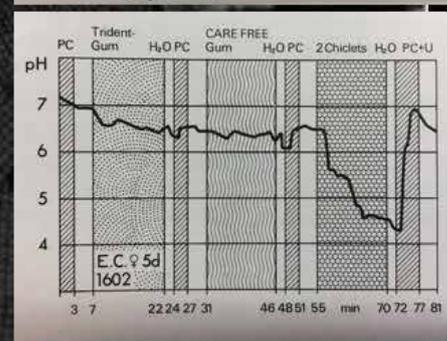
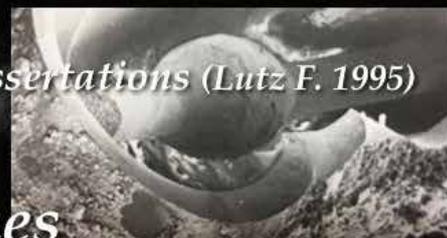


Figure 12

According to a compilation by Dr. Felix Lutz (1995), Mühlemann produced as author and co-author more than 400 scientific publications, many of them in English, and was the dissertation mentor for 14 advanced degrees and ca. 190 doctoral theses. His Hirsch-Factor for productivity and impact was estimated by Prof. Thomas Attin to be 28, which is particularly high for the «pre-digital» era. Mühlemann understood how to attract highly motivated co-workers and how to stimulate them. They were inspired by his research strategies. His personal work rhythm was very fast; he usually worked 80 hours per week. Because he slept only fitfully, he often went to his office in the Dental Institute at 4:00 a.m. He often worked well into the night. All of the monies he received as prizes and extramural funding he put right back into his department and into his co-workers' research projects. The light in his office was always «on,» and represented for his co-workers who went home early or came early in the morning the signet for the never-extinguished flame of science. Mühlemann's co-workers in the various special disciplines are listed here. In radiotelemetry those were Hans Graf, Hans-Caspar Hirzel, Jan DeBoever, Thomas Hassell and Thomas Imfeld; above-right one can observe the miniature pH-electrode, below that the partial denture with embedded pH-electrode and below-right a pH curve as the patient consumed a sweetened food product; note the pH fall to below 5.5., which signifies that the product is not «safe for teeth.»

# Textbooks and new departments

Hans Rudolf Mühlemann

## Textbooks: **Co-workers/collaborators**

- **Mühlemann HR.** *Introduction to Oral Preventive Medicine.* Hans Huber, Bern 1974.
- *Periodontology.* **Mühlemann HR, Rateitschak KH, Renggli HH;** Georg Thieme, Stuttgart 1975, 1978)
- *Adhesive Dentistry.* (**Lutz F, Lüscher B, Ochsenbein H, Mühlemann HR.** Juris, Zürich 1976)

## Establishment of new departments: **Expanding the medical, scientific basis**

- 1972 Oral Structural Biology (**H.E. Schroeder**)
- 1972 Oral Microbiology and General Immunology (**B. Guggenheim**)
- 1977 Station for Applied Prevention (**T. Marthaler**)

Figure 13

The co-workers who participated in the production of text books and academic successes in the Institute are acknowledged here. First was Dr. Hubert Ernst Schroeder, who received in 1972 a professorship in the new Department of Oral Structural Biology on the basis of his research and teaching in a broad medical-scientific spectrum, and as a direct result of his book «Oral Structural Biology.»

For Dr. Bernhard Guggenheim, Mühlemann established the «Department for Oral Microbiology and General Immunology.» The creation of this new department anticipated that eventually a vaccination could be developed against dental caries and periodontitis. Unfortunately, this early anticipation did not evolve. In 1977, Dr. Thomas Marthaler was the founding chairman of the «Station for Applied Prevention.»

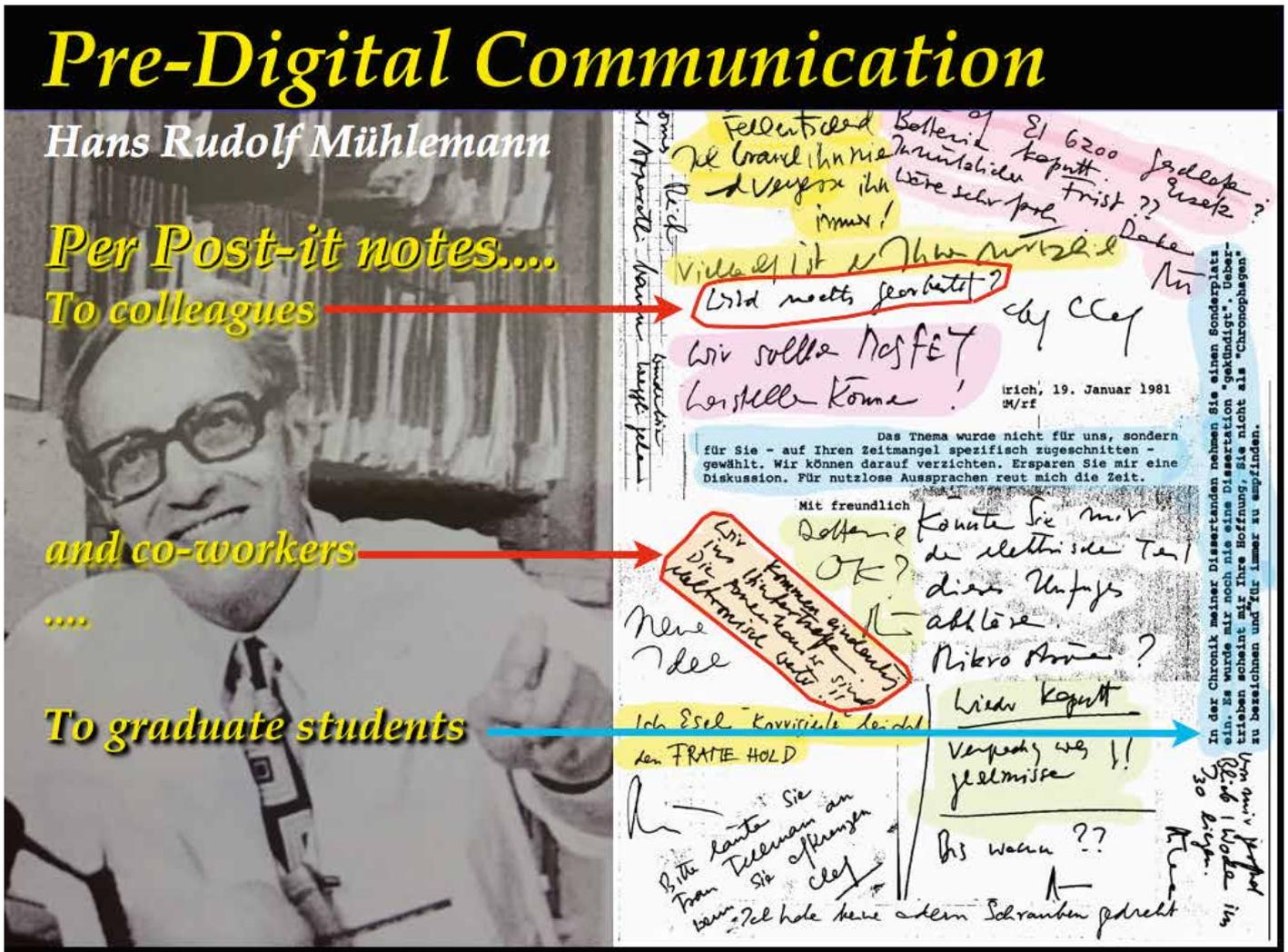


Figure 14

In 1970, when I first joined his team, Mühlemann already chaired the largest department in the Dental Institute, with about 80 co-workers. There was no E-mail at that time, so communication occurred by means of regular staff meetings, telephone but also via «Post-It» style notes either hand-written or typed. We thank Thomas Reich for the compilation shown at the right.

Let's pick out a few typical Post-It notes:

Number 1: «Do we work at night?» Because Mühli was a day-and-night worker, he naturally assumed that his colleagues also worked nights to assure that the Department would remain competitive, world wide.

Number 2: He worried that the Department would not be competitive versus the Americans in terms of electronic communication devices. Number 3: In 1991, Mühli had to confront one of his doctoral students, with whom he could not come to a reconciliation of events. Mühli's final note to this individual read: «In the chronology of my dissertation students, you have achieved a special rank. As a thesis mentor I have never been «fired» by a graduate student. It seems excessive to me to accept your hope to not refer to you as a «chronophage» («time waster») forever and a day.»

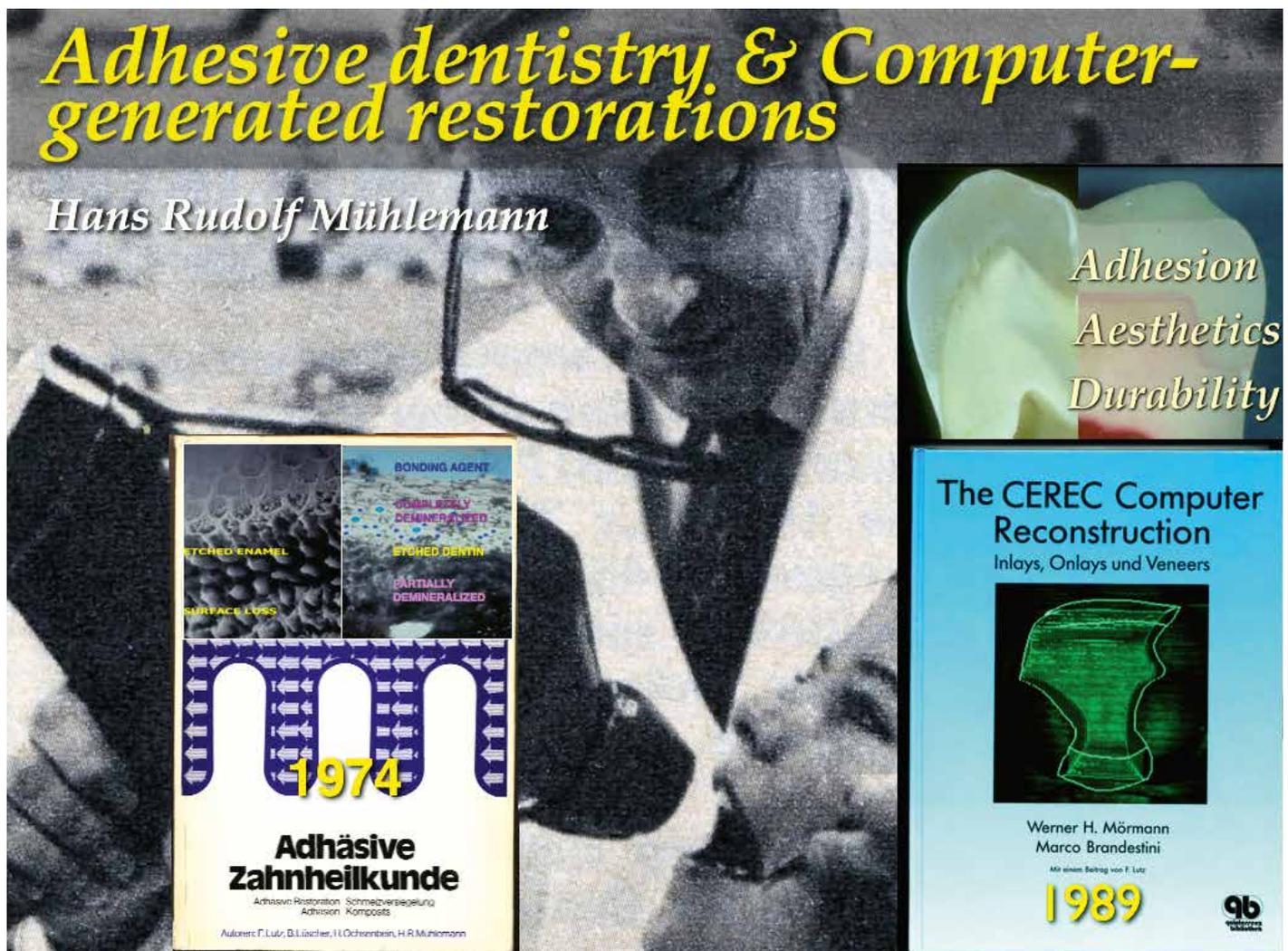


Figure 15

H.R. Mühlemann was supportive of the then-much-anticipated «adhesive dentistry,» which at that time was providing a significant benefit in terms of caries prophylaxis via pit and fissure sealants. Depicted here is Prof. Mühlemann performing a fissure sealing with a somewhat early polymerization light.

His adhesive-team under the direction of Dr. Felix Lutz laid the cornerstone for a clinically functional therapeutic cariology using composite restorative materials, with the publication of the text book «Adhesive Dentistry.»

The knowledge generated in our department, and the resulting clinical experiences form the basics for the adhesive bonding of ceramic CAD/CAM restorations, and were decisive for the clinical success of this method. Professor Mühlemann supported CAD/CAM technology, and I was able in 1983 to show him the first computer-generated CEREC MOD molar inlay produced on the bench after 6 months *in vivo* in a human patient.

## **Founder and member of scientific societies, commissions, committees: national and international**

*Hans Rudolf Mühlemann*

**1953 - 58 ZGZ**

*Member of the Board  
Dental Society of the  
Canton of Zurich ZGZ*

**1954 - 69 ARPA**

*Scientific Advisor to  
ARPA International*

**1961 FDI**

*Vice-President Scientific Committee  
Fédération Dentaire Internationale, FDI*

**1963 - 66 FDI**

*Member of the Commission for  
Dental Research, FDI*

**1964 - 65 CED-  
IADR**

*Founder and President of the Continental  
European Division of the International  
Association for Dental Research, CED-IADR*

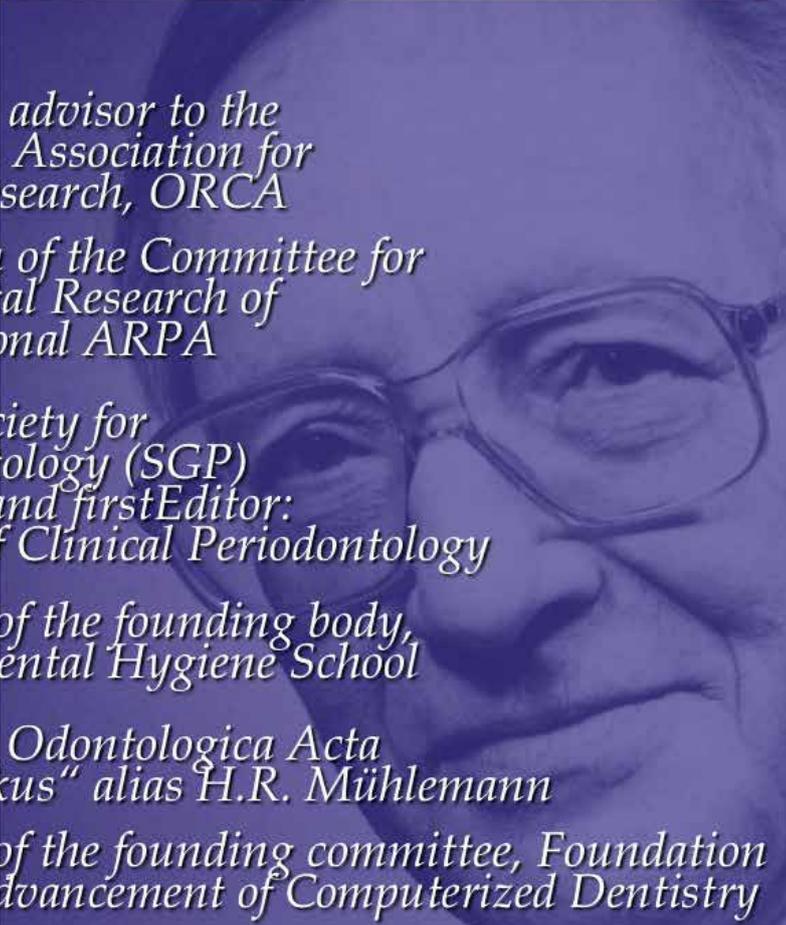
Figure 16

This photo shows H.R. Mühlemann greeting the world renowned periodontology professor Sigurd Ramfjord (U.S.A.).

H.R. Mühlemann was the instigator and member of numerous scientific societies, commissions and committees, as well as the founder and editor of national and international scientific journals. All of these activities represent significant factors in his enormous professional stature. He was from 1953 through 1958 a member of the governing committee of the Dental Society of the Canton of Zurich. From 1954 through 1969 he was a scientific counselor of the international Working Group for Periodontology (ARPA), 1961 Vice-President of the scientific advisory board of the Fédération Dentaire Internationale (FDI); 1963-1966 he was a member of the Commission for Dental Research of the FDI. 1964-1965 he was Founder and President of the Continental European Division of the International Association for Dental Research (CED-IADR).

## Activity in Organisations

Hans Rudolf Mühlemann



<b>1965-69</b>	<b>ORCA</b>	<i>Scientific advisor to the European Association for Caries Research, ORCA</i>
<b>1969-71</b>	<b>ARPA</b>	<i>Chairman of the Committee for Periodontal Research of International ARPA</i>
<b>1971</b>	<b>SGP</b>	<i>Swiss Society for Periodontology (SGP)</i>
	<b>J Clin Perio</b>	<i>Founder and first Editor: Journal of Clinical Periodontology</i>
<b>1972-75</b>	<b>DHZH</b>	<i>Member of the founding body, Zurich Dental Hygiene School</i>
<b>1956-75</b>	<b>HOA</b>	<i>Helvetica Odontologica Acta "H.V. Tikus" alias H.R. Mühlemann</i>
<b>1991-93</b>	<b>SFCZ</b>	<i>Member of the founding committee, Foundation for the Advancement of Computerized Dentistry</i>

Figure 17

With regard to his activities in various organizations, I want especially to mention that in 1971 he was a prominent founder of the Swiss Society for Periodontology (SGP), and the first editor of the Journal of Clinical Periodontology. From 1972 through 1975, he was a member of the founding board of the Dental Hygiene School of the Canton of Zurich.

In 1956 he founded the journal «Helvetica odontologica Acta» and was its editor until 1975. The background for these activities was that the results of laboratory and animal model research in his department could be published with short wait times. It is for this reason that he often published in Helvetica odontologica Acta under the pseudonym H.V. Tikus, which was an alias for Mühlemann (Hel.Ve.Tikus).

Still from 1991 to 1993 he was member of the Foundation for the Advancement of Computerized Dentistry in Zurich.

# 1977 60<sup>th</sup> Birthday Triumph parade and Circus artists

Hans Rudolf Mühlemann



Figure 18

For his 60th birthday, we surprised Hans Mühlemann! Along with his wife, Maria, he was picked up in Zurich and flown by helicopter to Stein-am-Rhein.

At the landing site, he was greeted by his co-workers (upper left) and transferred by chariot in a triumphal parade to the Circus Stey, where he encountered a knife-thrower, whose assistant was spared from the danger that evening! Everybody watched this performance with great anticipation, and Mühli successfully endured this challenge to his courage.

He then delivered a moving speech, filled with gratitude to his co-workers, on the occasion of his 60th birthday.

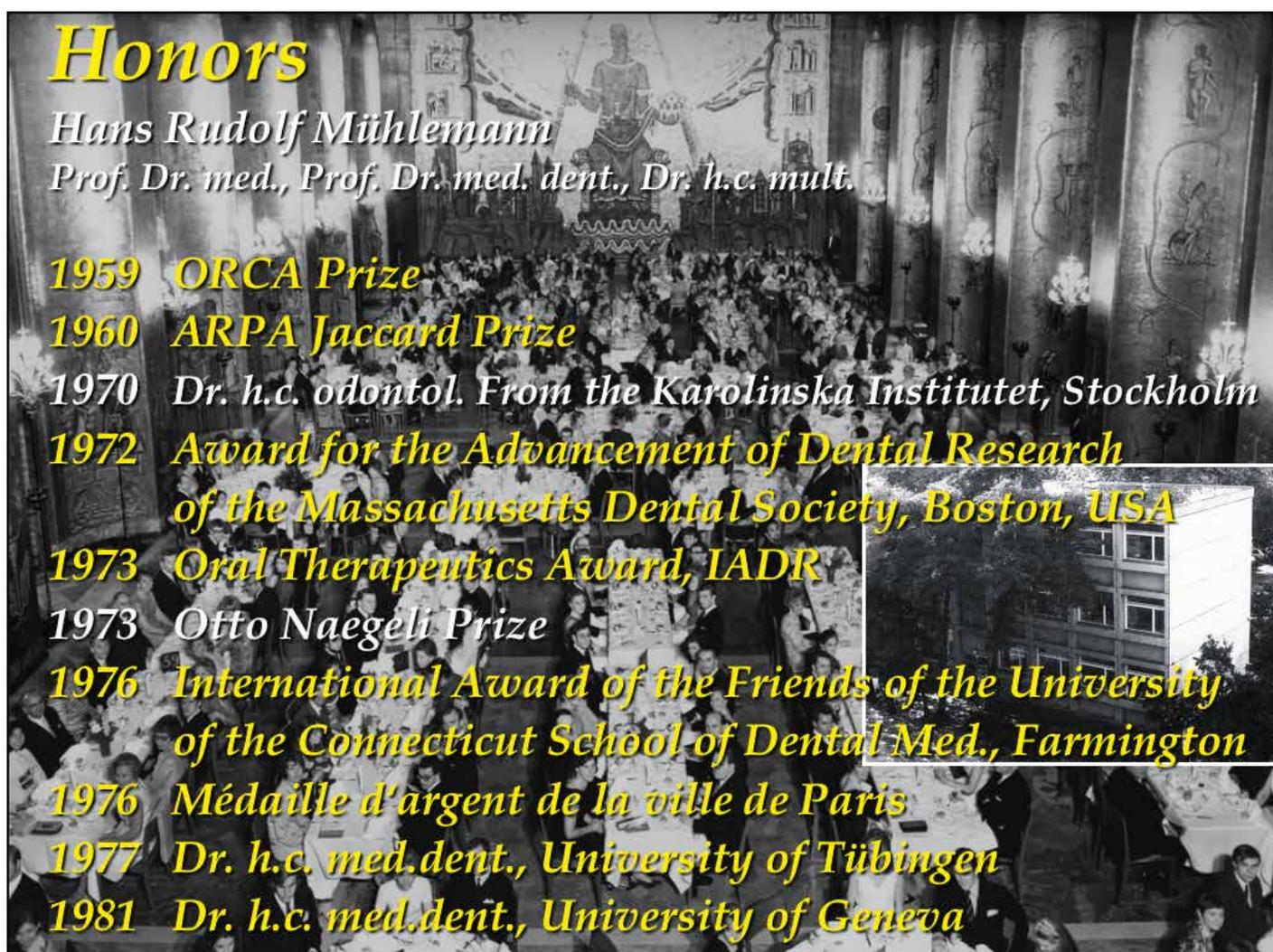


Figure 19

During his academic career, Hans Mühlemann received numerous prizes and awards in Switzerland and other countries. This photo is of the banquet at the promotion festival at the Karolinska Institute in Stockholm, Sweden, in May, 1970, where he received the prestigious «Honorary Doctorate» Dr. h.c. odontologiae.

In 1973, Mühlemann received, in addition to awards in the USA and in France, the 100,000 Swiss Frank «Otto Naegeli Prize for Medical Research.» The Otto Naegeli Prize is one of the most important scientific accolades in Switzerland, and is viewed internationally as a supreme award.

Mühlemann harbored the idea of creating a scientific center for research in dental medicine and the medical problematic of sugar, which he wanted to lead. Unfortunately, the educational hierarchy had no interest. Failing in this endeavor, Mühlemann invested his prize winnings into planning and construction of the Variel-Element Laboratory Building immediately adjacent to the Dental Institute at Plattenstrasse 14 (photo, right); this continued through 1987, and then the laboratory building was replaced by a bigger one housing the University of Zurich's Center for Commerce Research. 1977 and 1981, near the end of his career, Mühlemann received honorary doctorate degrees, «Dr.h.c.med.dent.» from the Universities of Tübingen (Germany) and Geneva (Switzerland).

## The legacy of H.R. Mühlemann is science-based, prevention-oriented dental medicine

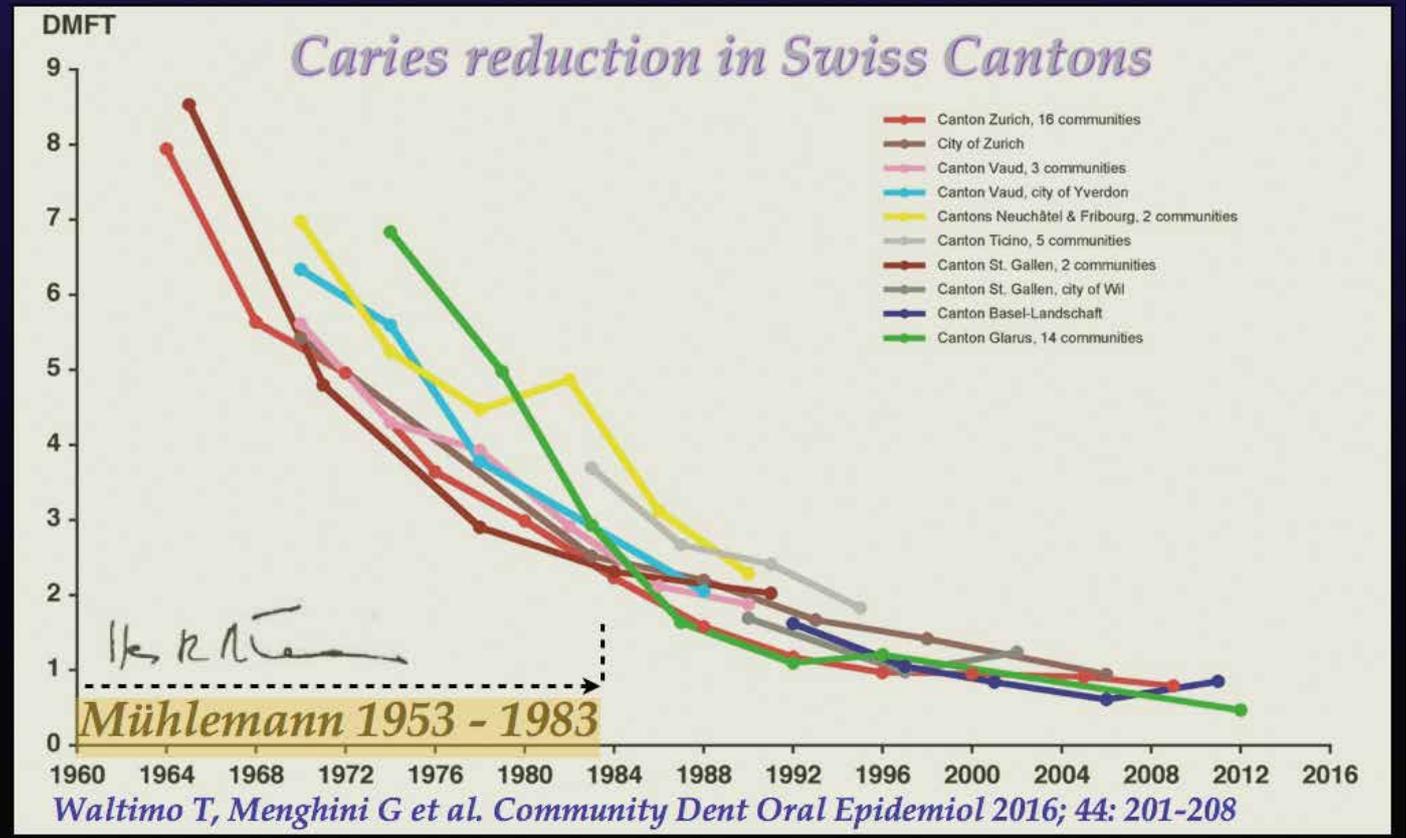


Figure 20

The legacy of H.R. Mühlemann in national and international dentistry and on citizens world wide is the scientifically based, prevention-oriented dental medicine. These curves depict caries reduction rates in various Swiss cantons, from a paper by Waltimo and Menghini, and the dramatic downward trend is impressive. Within the 30-year span of his working life, Mühlemann could observe such significant caries reduction in Switzerland but also internationally thanks to salt fluoridation, the increasing use of fluoride-containing dentifrices, in addition to the implementation of non-fermentable sugar substitutes. Mühlemann's motto was always «More oral health for more people.» His scientific and practice-oriented approach led directly to the realization of his motto. It is for this reason above all that we hold Professor Hans R. Mühlemann in esteemed high regard.

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Figure 21

For their assistance in the preparation of this lecture, I thank Marietta Jung-Mühlemann, Prof. Mühlemann's daughter, and Prof. Ulrich P. Saxer, Dr. Georgio Menghini, Dr. Herbert F. Wolf, Dr. Milan Schijatschky, Dr. Felix Wüst, Thomas Reich and Yara Yäkel. And I thank all of you in the audience for your attention.

Werner H. Mörmann

Werner.moermann@zzm.uzh.ch

SWISS DENT 2/2018 – Special issue in remembrance of the 100<sup>th</sup> birthday of Hans R. Mühlemann (\*August 26, 1917 – † June 1, 1997)

# Hans R. Mühlemann – Pioneer in the Research of the Oral Diseases Caries and Periodontitis

## The Liaison between Family and Science

Interviewer: Dr. Felix Wüst

Interview with Mrs. Marietta Jung-Mühlemann, Dr. med. Tarzis Jung-Mühlemann, Meilen ZH, Switzerland, and Prof. Dr. med. dent. Ulrich P. Saxer, Forch ZH, Switzerland; moderated by Dr. Felix Wüst, Editor of SWISS DENT

*On August 26, 2017, the Center for Dental Medicine at the University of Zurich hosted the «H.R. Mühlemann Symposium,» a testimony to the scientific legacy of Professor Dr. med., Dr. med. dent. Hans R. Mühlemann on the occasion of his 100<sup>th</sup> birthday. At the end of July 2017, in anticipation of this symposium, we published a collection of all of the articles authored or co-authored by Hans Mühlemann in SWISS DENT from 1980 through 1985, a «re-make» of this great man's writings. At the symposium and with the publication of SWISS DENT 1-2017, the emphasis was on Mühlemann's scientific activities. For this 1/2018 edition of*

*SWISS DENT, we wanted to discuss in more detail his personal interactions and his life as a husband and father. This was graciously made possible by Mühlemann's only daughter, Marietta Jung-Mühlemann. With us for this interview was Marietta's husband, Dr. med. Tarzis Jung, who, as a young medical student, had the opportunity to do his doctoral research dissertation in medicine in Prof. Mühlemann's department. Prof. Dr. med. dent. Ulrich P. Saxer, with a long history of working with Hans Mühlemann, joined us when we conducted this interview in the Jung-Mühlemann home in Meilen ZH, Switzerland.*

*My dear Mrs. Jung, we have gathered here on this radiantly beautiful summer morning to speak with you, Hans Mühlemann's daughter, about your father. You are the only child of Hans Mühlemann, and therefore you are the only person who can speak with knowledge and experience about living in the Mühlemann household. Dr. Jung, you are a physician, Director of the Institute for Radiology and Nuclear Medicine in the Zurich Waid Hospital, but you did your doctoral research with Prof. Hans Mühlemann, also a physician. From you, also, we hope to glean interesting information about Dr. Mühlemann. It is good that Professor Saxer has made himself available to support and guide this interview with you. Mrs. Jung, your father created a laudable liaison between his work as a researcher and scientist, and his family. How was that experience for you?*

MARIETTA JUNG-MÜHLEMANN: Dr. Wüst, I would first like to welcome you warmly into my home, and to welcome also my acquaintance of long-standing, Dr. Saxer. I am very glad that you have come here today to pursue a discussion about my father. It is now 20 years since he left us. As time goes by, there are many young dentists who do not even remember Professor Mühlemann, or that we have so much to thank him for. Let me say here at the

outset about my father: He always said «It is not the quantity that matters, it is rather the quality.» He lived his life according to this motto. He worked very hard, always, to live up to his own high professional and scientific standards. He demanded high quality from his co-workers and colleagues, but also from himself. During our holidays, he was always there for me, and he gave me the feeling that I was the best and the prettiest. It would not be possible to experience more exhilarating or happier vacations. When he was there for his family, he watched out for us and cared for us with the same intensity that he always exhibited in the workplace. But aside from vacations, during the week he was usually absent from home. During dinners, he would listen to the daily news on the radio, so he would not lose any time, and that meant that we were quiet during family meals. In the morning at 5 a.m., he was already «wired and ready» for the day; we could hear him searching for his glasses or his car key, and then he was gone and we could finally enjoy a comfortable breakfast. We looked forward with anticipation to weekends, when we often spent time with father's brother and his family in their vacation house in Wappenswil. On these occasions, father was again 100% father and family man. Whatever he did, he did intensively, very intensively.

*Following up on what you just said, it would seem surprising that your father would spend at least some weekend time in his office or clinic.*

MARIETTA JUNG-MÜHLEMANN: That happened, of course, but not regularly. When we were at home on the weekend, he often sat at his desk, worked, read the newspaper which, once read, he tossed onto the floor. As a young girl, I often sat under his desk – which was quite expansive – and again and again things would fall to the floor around me. As he worked or read the newspaper, my father would simultaneously listen to the police radio or the ambulance calls, or follow the repartee of a sports reporter on TV or radio. In addition to all of this, he always had someone's dissertation in front of him to correct or comment on. He was really an active, interesting and perplexed human being.

*How did your mother put up with it?*

MARIETTA JUNG-MÜHLEMANN: Pretty well. She lived totally for him and for me. When father was at home, he was the center of attention. He was the middle-point, the sun around which we all revolved. I was, as you know, an only child. Therefore, I never lacked for attention from my parents. Father or mother were always there, mom of course much more than him. But what did my father say? «It's the quality that's important, not the quantity.



The parents of Marietta: Hans Rudolf Mühlemann and Maria Ruth (called Mia) Mühlemann-Stoller. Photo taken in the Suvretta House Hotel in St. Moritz (photo: H. F. Wolf)



June 23, 2017, on the balcony of the home of the Jung-Mühlemann family on Seestrasse in Meilen ZH, Switzerland. (From left): Prof. Dr. med. dent. Ulrich P. Saxer, Marietta Jung-Mühlemann, Dr. med. Tarzis Jung-Mühlemann, Dr. Felix Wüst, Editor, SWISS DENT.



«Mühli» in his lounge chair on the beach in Sardinia; next to him, his young daughter, Marietta.

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*Vacation or holidays – Was that a topic of discussion in the Mühlemann household?*

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MARIETTA JUNG-MÜHLEMANN: Yes, and how! At that time, we went for five weeks each year to Sardinia, accompanied by two families that were close friends. Water skiing was at the top of the list. Father would pull us behind his speed boat for hours. He was always there only for the children: swimming, diving, catching fish; he did everything with us. When we were on vacation, there was, for father, no telephone and no professional responsibilities.

---

*Dr. Jung, you did your doctoral research under Professor Mühlemann. How did it happen that you, as a student of medicine, came to work with a «doctor-father» who was a physician but who spent most of his time and mental effort in dental research endeavors?*

---

TARZIS JUNG: Possible doctoral dissertation projects were publically announced, and I searched for a project that I was interested in. More or less by accident, I found myself in correspondence with Hans R. Mühlemann. He was looking for a doctoral student for a very special project. He believed that he needed a student of medicine for this project. It revolved around an experimental study with the accumulation of all of the appropriate scientific literature. I quickly realized that this endeavor would require much more time and effort than the then-common short dissertations by most student-physicians. In the end, Dr. Mühlemann set up an agree-

ment with the university that I could do my dissertation research in medicine with him even though he was a professor in the Dental Institute.

---

*You have us all intrigued! What was the main theme of your dissertation?*

---

TARZIS JUNG: It revolved around use of a zinc-hexetidine solution for the prevention of dental caries. I had to find out how much zinc remained in the oral cavity after a 30-second rinse. The goal was to clarify how much of the zinc in the oral cavity would be effective, and what amount of zinc would be finally absorbed by the body. Through an extensive perusal of the scientific literature, it was necessary to answer the question: What are the medical effects and side-effects of zinc. The experimental part of my research involved oral zinc retention; we studied this using volunteer human subjects.

---

*What was the central question, the theoretical/scientific inquiry? Why did Professor Mühlemann want to solve this query so precisely?*

---

TARZIS JUNG: It was a completely practical question. Mühlemann wanted to develop a new anti-plaque mouthwash, another of his many new products. This mouthwash contained zinc and hexetidine. Hexetidine had already been used successfully in the product Hextril®, and zinc in the mouthwash Lavoris®. His idea was to



«Mühli» with his young daughter, Marietta, adjusting the convertible top of his much-loved Triumph TR4 roadster, a car that was produced by the British company Triumph from 1961-1965. Because of his joint problems, he drove this classic «old timer» the short distance from the Dental Institute to the local post office every day to empty his post office box.

combine the two compounds, whose effects in vivo were already understood. The results demonstrated that the combination of the two substances exerted a synergistic effect on oral bacterial flora. The bacteria of the oral flora were more inhibited by the combination of the two compounds than by zinc alone or by hexetidine alone. Combined, these two substances were much more effective. But the game was not over! The enhanced effectiveness was the very reason why the new mouthwash never made it onto the commercial market. It was so effective that it was required that it be marketed as a drug. That would have led to additional studies, huge expense and the headaches associated with «governmental» regulations. These obstacles were simply too much for a simple mouthwash. One company took over the patent. As far as I know, no new product has been forthcoming on the OTC market.

*May I ask whether the proximity to doctor-father Mühlemann led you into the vicinity of his daughter, Marietta?*

TARZIS JUNG: In this regard I have to disappoint you. My wife and I got to know each other while skiing, far removed from dental/medical circumstances and our own professional positions. That was in Klosters, in winter, with temperatures at -20 C. I was skiing in Davos with some friends. I went into a restaurant that, because of the extreme cold, was virtually empty. Alone at a table sat a young woman. That was Marietta.

*So you met this young woman even before you were involved with Professor Mühlemann and your doctoral dissertation?*

TARZIS JUNG: Yes. My connection with Marietta lead naturally to my becoming more acquainted with her father. I harbored great respect for him and his many scientific accomplishments. I had never even considered going to him and asking him to be my doctoral mentor. I only approached him when I heard that he had an interesting idea for a dissertation project. That he would become my father-in-law was never on my mind. I was a second-year medical student and had never thought about getting married. Maybe

«Mühli,» as his friends call him, had considered me as a possible son-in-law, and wanted to put me to the test. He was always way ahead of the action! (Tarzis grins...)

*Dr. Saxer, you were then one of Mühlemann's colleagues in the University of Zurich Dental Institute, and you had constant contact with him. Did you play any role in the mouthwash projects, and what do you have to say about «Mühlemann as a father»?*

ULRICH P. SAXER: At that time, I had just completed my «Habilitationsschrift»-work, and we were concentrating on additive or synergistic effects of active substances in mouthwashes, working with Visiting Professor Sam Yankell. After a thorough search of the scientific literature, «Mühli» discovered the combination of zinc and amine fluorides. I, myself, found an old study showing good plaque reduction with zinc, which led me to propose combining zinc fluoride with the market product Hextril®, which had a well-known antiseptic effect in the neck/throat. But before we could even start on this new concept, we were faced with the Tarzis dissertation! You ask: «How was «Mühli» as a person?» We all pondered about why he was always the first in the Institute in the morning and the last to depart. We knew nothing about his family life and relationships. But one day, «Chef» made an unexpected proposal: He would invite us to his home once a month for an apéritif. And it happened: Every Thursday evening at 7 p.m. we all met at «Mühli's» home for a congenial apéritif and light hors d'oeuvres. That was always a sumptuous repast, and I remember fine tidbits, cold plates and buttered breads.

*What do you mean? What did Dr. Mühlemann want to achieve with this gesture?*

ULRICH P. SAXER: Certainly he wanted to show that he valued us, even loved us. We were somehow like his second family. But there was more to it. He wanted to promote and enhance discussion within and among the group of colleagues. The scope of the Dental Institute, which he headed, was becoming ever larger. Again



«Mühli» escorts his daughter, Marietta, down the aisle to the altar. The marriage celebration of Marietta and Dr. med. Tarzis Jung was on August 8, 1981 in Beznau.

and again, he created new departments. I am thinking about the departments of Professor Bernhard Guggenheim, Professor Hubert E. Schroeder, Professor Thomas Marthaler, the on-going activities in the new Variel-Building and the idea of a Swiss sugar research center. With the ever-increasing size of his realm, there was a loss of personal contact among its inhabitants; the cohesion, the unity, was lost. With his monthly apéritif evenings in his home, «Mühli» attempted to stem this tide of isolation, and to provide guidance to his colleagues and co-workers. On those evenings, his wife, Maria, played a huge, central role. She understood it masterfully, and displayed her obvious spontaneity toward the goal of success in personal relationships.

---

*Hans Mühlemann held degrees in both medicine and in dentistry. Do you know, Mrs. Jung, what came first: Medicine or dental medicine?*

---

MARIETTA JUNG-MÜHLEMANN: Those were the years during WW II. My father was an invalid, and therefore had no military obligation in Switzerland. When he was 18, he suffered a serious accident while skiing; because of severe knee injury he could not hike or even walk for prolonged periods of time. Later, because of improper loading of the joints, he had to undergo hip replacement surgery. It was this circumstance that rendered him unfit for military service. But he served as a Lance Corporal and «HD soldier,» which stands for «helper service.» Regarding the Swiss military and especially the higher ranks, my father held them in high esteem. Many times, he incorporated non-commissioned and higher officers into his team. He wanted to be a physician, but somehow during the difficult war years he decided to study dental medicine. During that time, all of the hospitals were fully staffed; the dental medicine program was of shorter duration and did not come with the years of internship and residency associated with medical education; upon graduation



The Mühlemanns – obviously in «party mood»



The couple in holiday attire.

he quickly became independent and could earn his own income. Following dental school, he pursued medicine, with the goal of specializing in oral surgery. During his course of medical studies, this goal disappeared and he returned to dental medicine.

---

*I have heard that your father never had a private dental practice. Is that true?*

---

MARIETTA JUNG-MÜHLEMANN: Yes, that's true. He never had a private practice, neither in the city nor in its outskirts. But he did always treat dental patients in his capacity as professor in the Dental Institute. Among his private patients was the Shah of Persia. But treating private patients was difficult and time-consuming because of the administrative structure of the Institute and insurance regulations. When he treated prominent dental patients for two or three hours, the whole Dental Institute often stood still. My father and the Shah of Persia developed a friendly relationship. Together they shared a bond, and they engaged in intensive conversations together. Such discussions ultimately led to the Shah creating dental hygiene schools in then-Persia, and the hiring of dental hygienists in his country. My father also visited in Persia. The intricacies of the insurance policies in the Institute finally caused my father to refer his most famous patient, the Shah, to a private dentist in Zurich.

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*Let's go back to the question of vacations. We have heard that the Mühlemann family enjoyed its holidays on the island of Sardinia. Were such holidays spent in one of the famous luxury hotels on that island?*

---

MARIETTA JUNG-MÜHLEMANN: You can talk about «luxury,» but it was not that way at all. Together with two friends, my father was able to purchase some coastal land from a sheep farmer for one Swiss frank per square meter. We owned three separate beachfront properties and one rocky hillcrest which we called the «Mühli-crest.» We lived on these beaches in tents, and invested much time and labor using an axe to build a primitive latrine. Over time, we did enjoy a bit of luxury by building a better latrine in a secluded pine forest. We had to haul water every day to the tank on top of the WC to keep the plumbing functioning. We also had a large cistern to catch rain water for drinking, which we carried in buckets. Sometimes, when we opened the valve, we got a frog first, and then the water! In sum: Completely uncomplicated and simple family life! To assuage our hunger, we had to go fishing. Once a week we took our little rubber motorboat into the town of Porto Cervo to eat in the pizzeria. The children either were towed there on water skis, or had to sit in the front of the overpowered boat to keep it from capsizing on the way.

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*Hans Mühlemann was without doubt a genius. In the life of such a man, the wife also plays a large role. Does anybody know how his wife, Maria, exerted any influence on her husband?*

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MARIETTA JUNG-MÜHLEMANN: My father, Mühlemann, was the «king» in the Dental Institute. But at home, mom ruled the roost. As the wife of a famous scientist and researcher, she shouldered the obligation of organizing all events related to persons invited to the Mühlemann home; and that was more than a few! She was a fantastic cook, and she greatly enjoyed her role as «social secretary.» But make no mistake: When Hans Mühlemann had urgent work to do, the work always took first place. His wife, Maria, accepted that.

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*Does anybody know anything more about Mühlemann's circle of friends/acquaintances? Did it consist solely of scientists?*

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MARIETTA JUNG-MÜHLEMANN: Absolutely not. The composition of the guest list in our home was mainly determined by my mother. She had worked for several years in the «Kunstraum Walcheturm» on «Kanonengasse» in Zurich, where she got to know numerous artists who were subsequently guests in our home. In addition, my father was quite an art collector himself. He often combined stones with a sculpture or a painting. That was typical for Hans Mühlemann. Many artists knew of him. Quite naturally, scientists, politicians and dental acquaintances were part of my parents' circle of guests. But above all, my father had a very close relationship with his brother, who lived in our apartment building and whose wife was my mother's sister. We were essentially one big family. We often spent weekends together, either at home or in our vacation house. My grandfather on my mother's side was in Sumatra as a surgeon and tropical disease specialist. Upon his return, he built a multi-family structure in which his three daughters lived with him and their families.

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*One question, which perhaps Dr. Saxer can best answer: Did Hans Mühlemann have any problems with governmental agencies or policies? I only know that he was opposed to any regulations against «importing» American dental hygienists and employing them in the Dental Institute.*

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ULRICH P. SAXER: Yes, that's true; but I don't know much about the details. When he was called back from Minneapolis, U.S.A., to chair a department in the University of Zurich Dental Institute, he was heartily welcomed here, also by politicians. The political elite soon also permitted him to establish a new professional journal «Helvetica Odontologica Acta» (HOA), supported it financially and published it in the English language, a journal that sprang from Mühlemann's own efforts and ideas. I also remember that my father, also a dentist, and also Dr. Franz Freihofer, then President of the Swiss Dental Society, SSO, and later also President of the Fédération Dentaire Internationale, FDI, warmly recognized Hans Mühlemann and his many accomplishments. Then, in 1970, Mühlemann was recognized with the highest award from the Karolinska Institute in Stockholm, then widely regarded as the leading European institution, the Honorary Doctorate. One year later, he was recognized as an honorary member of the Swiss Dental Society, SSO. Everyone valued highly the impulses that emanated from Hans Mühlemann. Later, when I worked in the Institute, I had to re-visit these considerations because conflicts arose here and there.

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*What about Professor Mühlemann's relationships with the other professors in the Dental Institute at Plattenstrasse 11? I ask this question because I heard one professor say that Mühlemann maintained better contact with his colleagues in the U.S.A. than he did with his colleagues in his own institute in Zurich.*

---

ULRICH P. SAXER: Above all, Hans Mühlemann had the highest regard for the accomplishments of his colleagues in the Dental Institute. As a former aspirant to the discipline of oral surgery, Mühlemann had a very good relationship with Professor Hugo Obwegeser, even though the two had crossed swords about more space in the institute. When tensions arose in the building, it could almost always be attributed to space considerations. Everybody wanted to expand their own activities, so available space became a serious issue.

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*Everybody knew it: Mühlemann was a chain-smoker. How did people accept that a person who dedicated himself to the oral diseases caries and periodontitis was addicted to cigarettes?*

---

MARIETTA JUNG-MÜHLEMANN: In those days, who did not smoke? But it's true, he was an extreme chain-smoker who used his previous



The newly graduated Dental Hygienist Marietta Mühlemann at the graduation ceremony of the Zurich Dental Hygiene School in 1980. From left: Professor Ulrich P. Saxer, her mother Maria Mühlemann-Stoller, Beatrice Turconi, dental hygiene instructor, Marietta's teacher. Statement from Marietta Jung-Mühlemann: «It was a time of wild parties, my first paycheck in my pocket, and the feeling of being extremely adult.»

cigarette butt to light the next one. Suddenly, from one day to the next, he quit. This is behavior that was typical for him. With regard to his nutrition, he was a fanatic: Three to four days without eating at all! These types of extreme behavior he viewed as normal. «That was Mühlemann!» He swallowed beta-blockers until he almost died of it. He pursued self-medication, then all at once became homeopathic. He was just a crazy man.

TARZIS JUNG: I remember: He went from three packs a day to zero tobacco within an hour. After 30 years, he said to me, he would again be addicted if he took one single puff.

MARIETTA JUNG-MÜHLEMANN: He had a tiger skin rug on the wall above his bed, a relic of grandpa's time in Sumatra. «Mühli» stuck a cigarette in the tiger's mouth, so he would always have to see it. My dad always saw the cigarette, but never grabbed it. It was a kind of masochism, and training in self-discipline, which was also typical of my dad.

ULRICH P. SAXER: I have to add here that at that time it was not yet scientifically clear to what degree smoking was injurious to systemic health, and much less for teeth. For obvious marketing reasons, the tobacco «industry» had provided false reports about nicotine and its addictiveness. But reports soon followed that nicotine consumption is damaging, especially for teeth. We have known this conclusively for about ten or fifteen years, but we suspected it much earlier. Numerous clinical studies were performed in the late 1980s and the early 1990s. Some claimed one result while others claimed the opposite. Responsible for these conflicting results was the fact



«Mühli» was a heavy smoker. From one day to the next, he became a non-smoker. In order to give himself self-discipline, this tiger skin rug hung above his bed. The tiger held a cigarette in its jaws.

that the quantity of cigarettes smoked by the study subjects was never included in the data analyses. Around the year 1985, the term «pack/year» was introduced. Studies then included information about how many packs of cigarettes were smoked per day. One «pack/year» was defined as «one pack per day,» the upper limit permissible. But for a subject who smoked two or even three packs per day over a time span of, say, 20 years, corresponding to 40-60 pack-years, would exhibit initial visible damage to tooth structure. The medical injuries occurred later than the dental injuries; the systemic damage was observed not only in the lungs, but also in vasculature and all internal organs.

---

*As a layperson, I always thought that smoking enhanced calculus formation.*

---

ULRICH P. SAXER: That's true. But it's not significant. I am interested to know from Mrs. Jung-Mühlemann when her father stopped smoking.

MARIETTA JUNG-MÜHLEMANN: That was in the 1970s. As we said before, he just suddenly stopped smoking, from one day 'til the next. Apparently he just decided that smoking is dangerous and a heavy burden to bear. But my mother remained and is a light smoker, and my father tolerated this even after he became a non-smoker. He said that mom's smoking gave him at least a little of the taste of smoking.

---

*Mrs. Jung, if I am correctly informed, you were trained as a dental hygienist. Is that what your father wanted you to be?*

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MARIETTA JUNG-MÜHLEMANN: First I studied nursing as a profession. When I met my husband, he had only praise for my chosen career. That would be ideal in a family if the mother is also a nurse. In addition, nursing offered the possibility for part-time work, which again was a positive aspect vis-a-vis family life. First I was a nurse in a Protestant order, but this was not necessarily compatible with my up-bringing, which was not strictly Christian. My father then suggested that I go back to school to be a dental hygienist; furthermore, this additional education would not require much more time. By this time, the dental hygiene school, DHSZ, that had started was fully up and running. One could say that my father founded a school that suited me to a «T.» (Marietta Jung laughs)

---

*Were you a good student in the Zurich DH school?*

---

MARIETTA JUNG-MÜHLEMANN: Oh, awful!

ULRICH P. SAXER: I must intervene here. I was the Director of that DH school, and I can confirm that Marietta was a good student. She worked with the same motto as her father: «Quality, not quantity.» Marietta Jung-Mühlemann: My grades were OK, but I was not the brilliant student that some people might have expected from the daughter of Professor Mühlemann. Only one time did I have a serious problem with my teachers: A patient had abruptly canceled an appointment; in a private dental office there were always many tasks to fill up unscheduled time. We chose another course: Three of us took off and went surfing in the lake for a couple of hours! I was told in no uncertain terms: «Ms. Mühlemann, you were not in school. You disappeared; that's not allowed!» This was especially bad for me, because she was not only a teacher in the DH school, she was my dad's dental hygienist at the university. Nobody likes it when one's misdeeds in school simultaneously become a family matter. Even the privilege of being Professor Mühlemann's daughter can have its disadvantages!

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*Dr. Saxer, you were the director of the DH school. Are you familiar with this incident?*

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ULRICH P. SAXER: I was director of the DH school on Minervastrasse 99 up until 1983, but only half-time. The other half I was working in the Dental Institute in Prof. Mühlemann's department. Mrs. Mühlemann completed her DH studies somewhere around 1980. The incident in question must have occurred during my stint as half-time school director, but I can't concretely remember the event. Mrs. Beatrice Turconi was the first person to receive her diploma in the first class, in 1975. She was the first Swiss Dental Hygienist to work for Professor Mühlemann. And she was an excellent clinician! Before concluding this interview, I'd like to return to Hans Mühlemann the man. We have heard that he lived «on the edge.» Can you give any other examples of this extreme living?

TARZIS JUNG: We talked about his skiing accident. I remember that he sped down the ski jumping ramp – something that normal skiers would never do. He seriously injured his knee when he crashed into a pile of stones.

MARIETTA JUNG-MÜHLEMANN: He harbored one special eccentricity. He would always order a Zug cherry cake simply because it was possible to do this electronically already in 1980. He told us even back then that electronic shopping represented the future of commerce. Of course we all laughed at him. He had in his car the very first car-phone, from the Autophone Company. It was a heavy, large apparatus that he kept in the trunk of his car. My dad always said that the future would be marked by phones that a person could carry with him at all times. He really was a visionary, a pioneer. He predicted many of the then-futuristic sounding developments, which are for us today taken for granted. It's just unbelievable! Thirty years ago he said; «You'll see. There will come a time when people no longer go to an office to work, but will instead work at home on a personal computer over the Internet!»

TARZIS JUNG: I am thinking of Mühlemann-the-man in terms of a «leader of colleagues.» Because I was an army officer, he always wanted to discuss the concept of leadership with me. He told me that when I one day become a «Chef» and have to hire people, that I should always hire people who are better than me or who could do things better than me. Otherwise, I would not be able to make progress. I have always tried to incorporate this thought in my own actions. The second tip he gave me was after I told him that my workload was drowning me. His answer was simply: «It is not the job of a «Chef» to do all the work. His first duty is to make sure that the work gets done and that his workers can do the job!»

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*Dr. Jung, what happened when you finished your dissertation work with Hans Mühlemann? Did you remain with him?*

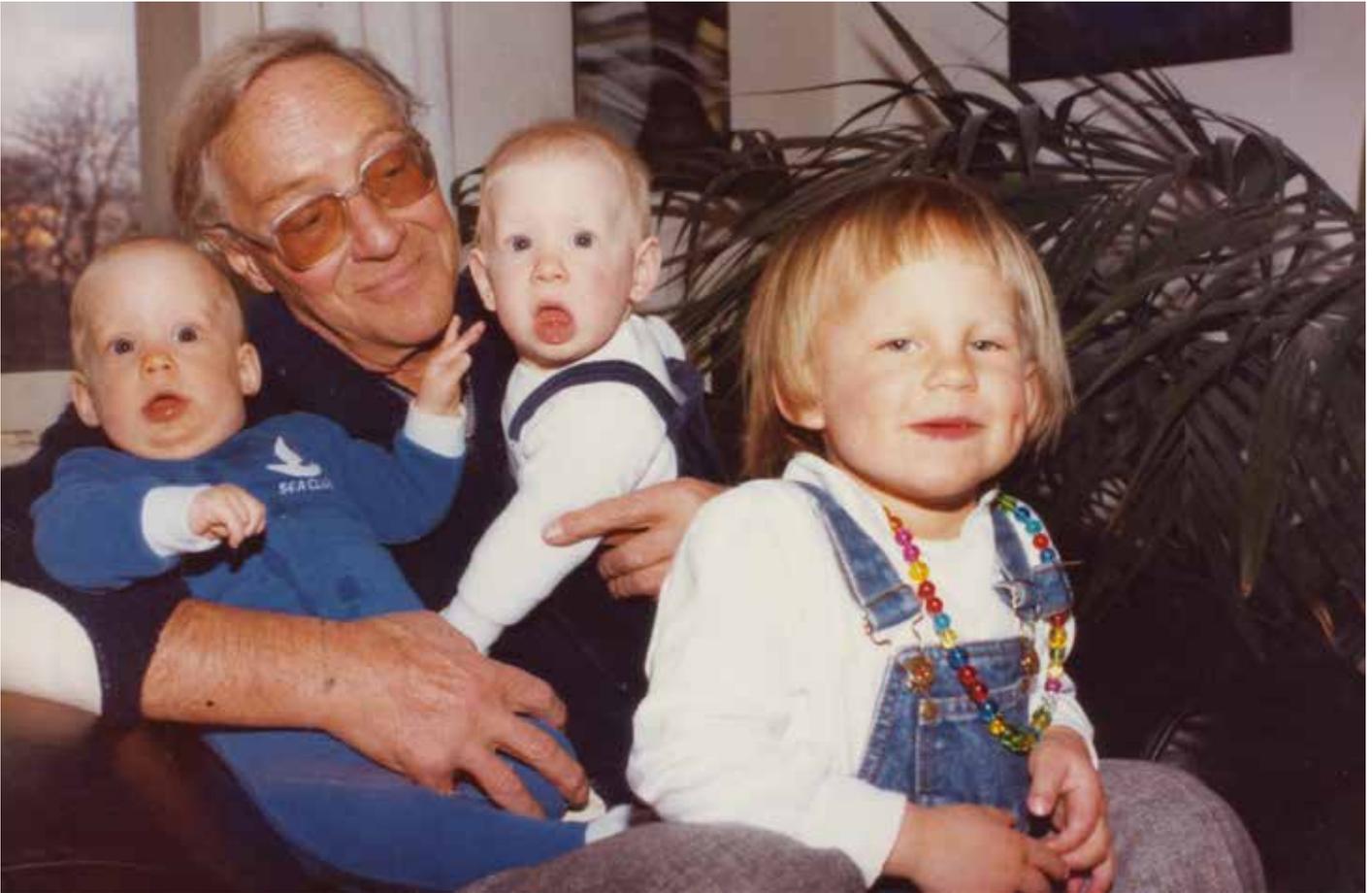
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TARZIS JUNG: No, I couldn't do that because I finished my doctoral work during my third year of medical school, parallel to my other studies. Also, it was very challenging. I wrote my dissertation according to his instructions. He said it was good work, made a few changes, and told me to write the whole thing over again! I provided him with a second version; it came back to me covered with red ink! I had to write my doctoral dissertation about ten times before he OK'd it. At that time, writing was done on an old-fashioned type writer.

---

*Dr. Jung, despite these difficult times as a doctoral student with Professor Mühlemann, do you have nothing more to do with dental medicine today?*

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«Mühli» with his three grand children. He holds the two twins in his arms: left in the photo Tinja, right Nadja; next to them at the right, Anja, the first-born.

#### Interview participants

*Marietta Jung-Mühlemann, Certified Dental Hygienist, photographer, Pix4kids (Baby and child photography, Marietta@pix4kids.ch) and children's photo studio (www.kinderfotostudio.ch), Meilen ZH, Switzerland*

*Dr. med. Tarzis Jung, Specialist in Radiology FMH, MHA, Chief of Radiologie und Nuclear Medicine, City Waid Hospital, Zurich, Past President of the Swiss Society for Radiology (SGR- SSR), Zurich, Switzerland*

*Prof. Dr. med. dent. Ulrich P. Saxer: Professor and Teacher of Periodontology & Preventive Dental Medicine, University of Zurich (1980 – ), founder and director of the first Dental Hygiene School in Zurich (DHZS) 1973-1993, 1994-2010 Director of the Prophylaxis Center of Zurich (PPZ) with combined private dental hygiene school (Prophylaxeschule Zurich Nord, PSZN), Zurich, Switzerland*

indirectly I have remained connected to dentistry: My wife is caries-free, my children and grand children are caries-free, all thanks to the rigorous school that we traversed with Hans R. Mühlemann.

---

*We will leave these parting words as the conclusion to this interview. Mrs. Jung, my friends, I thank you for this discussion.*

---

#### Contacts

*Marietta Jung-Mühlemann  
mariettajung1@me.com*

*Dr. med. Tarzis Jung-Mühlemann  
tarzis.jung@waid.zuerich.ch*

*Prof. Dr. med. Ulrich P. Saxer  
u.p.saxer@icloud.com*

TARZIS JUNG: No. I'm chief of radiology in the Zurich Waid Hospital: MRI, CT, ultrasound and vascular interventions are my world. But

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# Hans R. Mühlemann – His Life

Source: Private archives of Ms Marietta Jung-Mühlemann, Meilen, Switzerland

## C U R R I C U L U M V I T A E

Mühlemann, Hans-Rudolf

o.Prof., Dr.med., Dr.med.dent., Dr.h.c.odontol., Dr.h.c.med.dent.,  
Dr.h.c.med.dent.

Born: St. Moritz, Switzerland, August 26, 1917

Head (Ordinarius), Department of Cariology, Periodontology and Preventive Dentistry with Units for Experimental Caries Research, Bioelectronics and Applied Preventive Dentistry, Dental Institute, University of Zurich, Switzerland

U. Zurich, Dentistry, 1945 (D.D.S.)

U. Zurich, Medicine 1948 (M.D.)

U. Zurich, Senior assistant orthodontics and oral surgery, 1946-1951

U. Zurich, Privat-Dozent 1951

U. Illinois, Radiobiology, 1952

U. Minnesota, Periodontology, 1953

U. Zurich, Professor of Cariology and Periodontology including Pathohistology, 1953

U. Zurich, Professor of Cariology, Periodontology and Preventive Dentistry, 1977

U. Zurich, Dental Institute: Director 1963-1966

Chairman of the Dental Faculty 1972-1974

Founding President, Continental European Division of Int.Ass. Dent.Research, 1964/65

President, European Organization for Caries Research (ORCA), 1973-1975

President, Swiss Ass.Res.Parodontopathies (ARPA), 1952 and 1968-1971

and President Founder, Swiss Soc. Periodontology, 1971-1974

Vice-President: Swiss Union of Nutrition, 1973-1976

Honorary Vice-President, IADR, 1967, Co-President ORCA 1973

Vice-President, Commission Scientific Assembly, Int.Dental Federation (FDI), 1961

Member, Commission on Dental Research, FDI, 1963-1966

Member, Advisory Commission of Public Health Department. Canton of Zurich, 1964-1976

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Member, Oral Therapeutics Award Committee, IADR, 1964-1979

Scientific Advisor, ORCA, 1965-1969, and International ARPA  
1954-1969

Chairman, Committee on Periodontal Science, International  
ARPA, 1969-1971

Member of: Am.Dent.Ass. Switzerland, Swiss Soc.Endocrinol.,  
Swiss Soc.Clin.Chem., Am.Ac.Periodontol., Soc.Exper.  
Biol. & Med., N.Y.Ac. Sciences, Europ. Orthodontic  
Soc., Soc.Biol. Rhythm, Biometric Soc., Soc.Sigma XI,  
Int.Soc.Chronobiology.

Affiliate Fellow of: Am.Ass.Adv.Sci., Royal Soc.Med., London

Corresponding Member of: German ARPA, Groupement Internat.  
Recherche Sci., Swedish Dent.Soc., Finnish Odont.Soc.

Founder and Editor of Helvetica Odontologica Acta, 1956-1976

Promoter and Editor-in-Chief of J.Clin.Periodontology, 1974-1976

Co-Editor of Abstracts, Schweiz.Mschr.Zahnheilk.

Co-Editor of "Parodontologie", 1952-1958, and 1970-1971

Corresponding Editor, J.Or.Surg., 1947-1957

Edit.Adv.Board Member: J.Oral Therapeutics & Pharmacol.  
1965-69. Advances Oral Biol., 1965-, Deutsche Zahn-  
Mund und Kieferheilk., 1958-1980, Oral Abstracts,  
1966-1975, Quintessenz 1963-, J. Preventive Den-  
tistry 1975-

Chairman: Caries Symposium Zurich 1961  
International Conference on Dental Plaque,  
New York, 1969, 5th International Conference on Oral  
Biology, Horgen-Zurich 1971 Symposium on Periodontal  
Research, 15th Congress FDI, Mexico-City, 1972  
Various postgraduate courses on preventive dentistry  
in several countries

HONORS: ORCA Award 1959, ARPA Jaccard Award 1960,  
Dr.h.c.odont. (Karolinska Institutet, Stockholm), 1970

Award for the Advancement of Dental Research (Massachusetts)  
Dental Society, Boston), 1972

Oral Therapeutics Award (International Association for Dental  
Research), 1973

Otto Naegeli Award (highest distinction in Switzerland for  
achievements in medical science, US\$ 60'000), 1973

First International Award of the Faculty and the Friends  
of the School of Dental Medicine, University of  
Connecticut, Farmington, Conn., 1976

Dr.h.c.med.dent., University of Tübingen, GFR, 1977

Dr.h.c.med.dent., University of Geneva, Switzerland 1981

-3-

Honorary Membership: Zurich Dental Soc., 1963, Soc. Odont. Vaudoise, 1967, Swiss Odontol. Soc., 1971, German Odontol. Soc., 1974, British Soc. Periodontology, 1974, Swiss Society of Periodontology.

Honorary Foreign Member of Académie de Chirurgie Dentaire, Paris, 1976.

Author and co-author of 400 scientific publications concerning research in biorhythms, tooth-mobility, gingival bleeding, experimental caries (enamel solubility, caries inhibitors), carbohydrates (fluoride- and pH-telemetry), dental calculus (experimental, epidemiology), occlusion, adhesive dentistry, plaque pharmacology.

Textbooks:       Orale Präventivmedizin, H. Huber, Bern, 1974.  
                  (English Edition: Preventive Oral Medicine,  
                  1976, Japanese Edition, 1978).

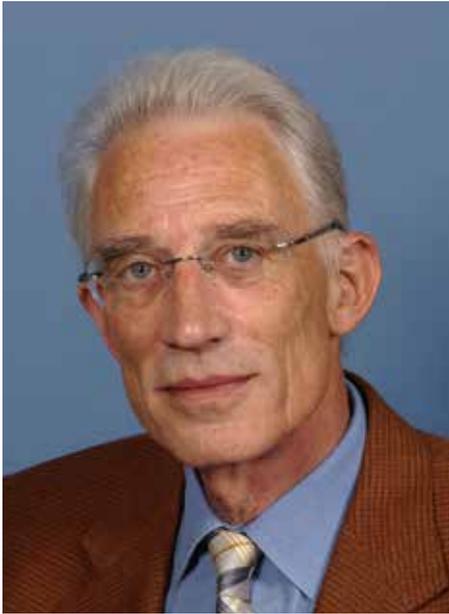
Parodontologie, Thieme Press, Stuttgart, 1975  
and 1978.

Adhäsive Zahnheilkunde, Juris Press, Zürich,  
1976.

Main achievements: Promoter of prevention of dental and periodontal disease at scientific, educational and public health levels. Founder of Bioelectronic Unit, Plaque-pH-Telemetry, Development of amine fluorides since 1957.

Zurich, June 1981 HRM/av/DISK HRMPER

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## Hans R. Mühlemann – Companions Remember

Dear Readers

The SWISS DENT editorial board put out a call to former colleagues of Hans R. Mühlemann, asking them to share their personal remembrances of this pioneer in research on dental caries and periodontitis, for this 2/2018 edition of SWISS DENT. These contributions were not intended to be scientific statements, but rather more like anecdotes assembled as «short stories.»

The realization of this good idea, however, proved to be beset with problems. Unfortunately, many of Mühlemann's early companions have passed away. Furthermore, his radiant personality and his uncanny ability to motivate individuals to ever more and higher research goals were so effective and sustained that in Switzerland, in Europe and even overseas there remain still today numerous former «Mühli»-companions; many of these remain active in their professions, some have achieved emeritus status, some have retired but maintain their interest in their respective scientific disciplines.

SWISS DENT has invited several of Mühlemann's former companions to commit to paper their memories of the time they spent with Hans R. Mühlemann. Many other voices would have gladly come forth in this way, but that would have virtually exploded this edition of SWISS DENT. We appreciate your understanding.

I wish you much enjoyment as you read the memories from companions of our distinguished mentor and teacher, Hans R. Mühlemann.



Prof. em. Dr.med. dent. Thomas Imfeld, MBA, Stäfa ZH, Switzerland

# Roche Kaiseraugst

## SWISS PHARMA 2/17

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One billion Swiss francs for  
expansion in Kaiseraugst –  
three billion Swiss francs  
for transformation  
of the Basel site

Special issue SWISS PHARMA 2/2017

Published in cooperation with  
the company F. Hoffmann-La Roche Ltd,  
Basel and Kaiseraugst

This issue of SWISS PHARMA 2/2017  
also is available as SWISS PHARMA 1/2017  
in a German version.

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#### EDITORIAL

Roche in Kaiseraugst –  
expansion on a grand scale

The continuing development of Roche's  
Basel and Kaiseraugst site

– *Dr Urs Hofmann*  
Member of the Cantonal Council  
Head of the Department of  
Economics and Internal Affairs, Aarau

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#### ROCHE BASEL ROCHE KAISERAUGST SITE MANAGEMENT

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Operational and strategic tasks for Basel and Kaiseraugst site management

– *Discussion with Jürg Erismann,*  
Head of the Basel and Kaiseraugst Site,  
F. Hoffmann-La Roche Ltd, Basel

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Site Head Kaiseraugst, Drug Product  
Manufacturing, Pharma Technical  
Operations Biologics, and Dr Ulrike Falk,  
Site Quality Head, F. Hoffmann-  
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Technical Operations, Basel Solids  
Manufacturing, F. Hoffmann-  
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Management, Kaiseraugst

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– *Discussion with Dr. Anita Maurhofer,*  
Head of Global Clinical Supply Chain  
Management, and Mattie Coolen,  
Head of Clinical Supply Operations  
Kaiseraugst, F. Hoffmann-La Roche Ltd,  
Basel

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– *Discussion with Ueli Grossenbacher,*  
Head of Apprenticeship Training,  
F. Hoffmann-La Roche Ltd, Basel

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# Hans R. Mühlemann

## Professor Hans R. Mühlemann – «Chef», Mentor, Friend

Prof. em. Dr. med. dent. Thomas M. Hassell, B.S., D.D.S., Ph.D., C.B.A., Hight Point, North Carolina, U.S.A.

*As a very young, single, naive, untraveled and unrefined student of dentistry in Indiana, U. S. A., in 1967, my immediate goal became to pursue a career in dental research in a foreign country and in a new language. Because I had had the good fortune of working as a Laboratory Assistant for Dr. Joseph Muhler – co-inventor of the caries-preventing stannous fluoride dentifrice Crest® – I was aware of other universities where similar research was on-going at that time. In our dental school library was a small book entitled Dental Schools of the World, and I used that book as a*

*source for the addresses of dental research centers in Stockholm, Tokyo, Berlin, Oslo, Jerusalem and Zurich. With reckless abandon, I wrote to these centers, asking for a position. To my surprise, I received a few tentative inquiries, but the strongest offer came to me from Prof. Dr. Hans R. Mühlemann in the «Kariesforschungsstation» at the University of Zurich. I accepted immediately, and upon graduation as a dentist in 1969, I packed my few belongings and departed the U.S.A. for the first time in my life, heading for Switzerland.*



«Muehli» (middle in the photo) with his colleagues Professor Klaus Rateitschak (+ left) and Dr. Herbert Wolf (right), both former members of the «Muehli-Team.» The photo stems from 1988, in Lugano, Switzerland, on the occasion of the Annual Congress of the Swiss Dental Society.



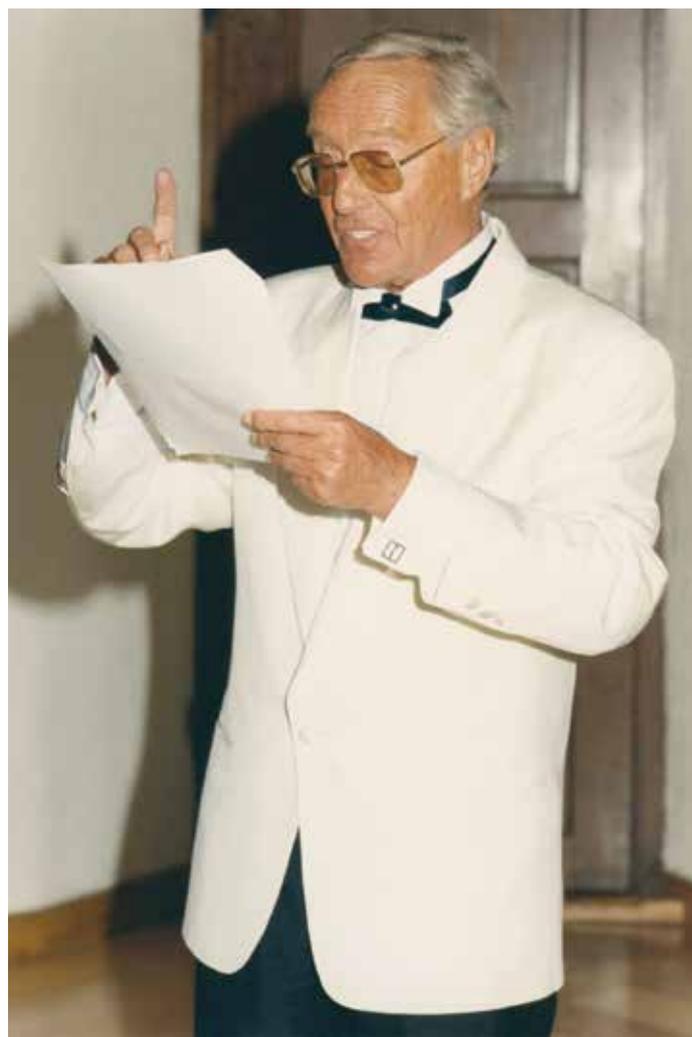
The author, in 1970 in the radiotelemetry laboratory of the Zurich Dental Institute's Kariesforschungsstation. Radiotelemetry, introduced for oral cavity investigations by Dr. Hans Graf (member of the «Mühli»-Team in the sixties, later Professor in Bern), was subsequently carried out in Mühli's department by Dr. Jan DeBoever (emeritus professor of the University of Gent, Belgium), and then by the author, followed by Professor Thomas Imfeld (recently retired from the position «Mühli» originally occupied). Dr. Imfeld published a book (14) dealing with intraoral radiotelemetry. The technique permits real-time recording of intraoral and interdental pH, fluoride content, temperature and calcium levels, and became the industry standard for labeling foodstuffs as «safe for teeth.»

### HANS R. MÜHLEMANN – THE «CHEF»

Arriving at the Kariesforschungsstation badly jet-lagged, I met Professor Mühlemann in his office and he said to me: «Welcome. They call me «Chef». Go and meet some of the people here and find your way around.» So, I wandered the laboratories and clinics, asking «Do you speak English?» of every person I met. I soon learned that this is the way Professor Mühlemann (henceforth in this article I shall call him «Mühli») operated as chairman of his department, which consisted of both small and large cadres of clinicians and laboratory scientists in a myriad of fields, scientific disciplines and dental/clinical specialties.

The well-accepted meaning of the French word «chef» is a person who creates fine meals from excellent ingredients. «Mühli's» «ingredients» were his colleagues and co-workers, and the fine repasts were the hundreds of papers published in peer-reviewed and highly-respected professional journals over the years. As «Chef» of his large and diverse department, «Mühli» always gave free rein to each individual to develop him/herself independently, but working within and for the enhancement of the group's dynamic, sometimes volatile, scientific interplay. Yet with his extensive training, education and experience in many dental and medical disciplines – including operative dentistry, cariology, endodontics, prosthodontics,

periodontology, oral surgery, microbiology, pathology, pharmacology, and oral structural biology (histology) – «Mühli» was able to guide his varied group of colleagues through difficult and often confusing scientific enigmas, providing direction and encouragement. «Mühli» was a selfless teacher of the first order. He discovered links between and among disciplines, leading to scientific interactions that otherwise would likely not have occurred. «Mühli» held various forms of staff meetings, sometimes a small group of people working on a single project, other times several groups together working on more intertwined endeavors, but always – bi-weekly or monthly – a meeting of his entire staff (often 30+ individuals), with each group presenting its most recent data for consideration by all departmental members. These group interactions provided scientific and collegial input for all, the «big picture» of the team's ultimate goals and aspirations. As «Chef», «Mühli» was acutely aware that «science isn't inexpensive.» He took it upon himself to be the major fund raiser for the many projects on-going in his department. He consistently procured support from State and Federal (Swiss) sources, but also and perhaps more importantly from extramural sources including small and large industrial companies in Switzerland and other countries, including major long-term funding from several major companies in the United States (e.g., Colgate, Warner Lambert, the producers of Listerine® and others). A man with endless scientific hypotheses, «Mühli» would challenge his graduate students and junior faculty to tackle new projects, always prepared to invest in his young col-



«Mühli» making a formal presentation to honor Professor Klaus Rateitschak (t) on his birthday (photo ca. 1988). Rateitschak was on the «Mühli»-Team for many years before taking the Chair in Conservative Dentistry and Periodontology at the Dental Institute, University of Basel, Switzerland.



«Mühli» bestowing the first Hans R. Mühlemann Research Prize to the author, during a ceremony at the University of Bern Dental Institute (1984). This prize is presented annually to a young investigator who wins an international competition among applicants who must submit a written manuscript and present a formal lecture before a panel of academic judges. The prize consists of a monetary award and an engraved plaque.

leagues' fresh enthusiasm from monies he'd raised from outside the department.

For «Mühli», being «Chef» meant far more than being the «boss». It meant being the leader of a complex team of clinicians and laboratory scientists who interacted daily not only among themselves, but also with members of other departments, other dental schools, and with educators and scientists the world over. He spoke five languages fluently, but almost always insisted that members of his team publish their work in English, which «Mühli» often called «the language of science». His desire was to command the respect of all clinicians and scientists worldwide, respect for science conducted by scientists in his native Switzerland. He founded the well-respected Swiss dental journal *Helvetica Odontologica Acta*, and demanded that all who published their work therein must do so in English. He was also the impetus behind the origination of this present professional journal *SWISS DENT*. He stood beside the cradle when *SWISS DENT* was founded. He was at the start of *SWISS DENT* and he was the force behind the composition of the first issues of the journal. It was he who formulated the subtitle of the Journal: «Swiss Journal of Oral Preventive and Curative Medicine». As «Chef», «Mühli» was the overall manager and coordinator of all aspects of departmental functions, including personnel matters, fiscal exigencies and statutory compliance measures.

#### HANS R. MÜHLEMANN – MENTOR

According to Webster, a mentor is «a wise and trusted counselor or teacher.» That definition fits «Mühli» to a «T.» He shared his limitless wisdom with all those who trusted him or were counseled by him. For me, he provided mentorship mostly in the form of guidance. I arrived at the Zurich Dental Institute with no research project or area of scientific inquiry in mind. My limited experience in dental research had been primarily with dentifrice abrasive compounds (1), and with anti-caries fluoride agents, mainly stannous fluoride (not the organic amine fluoride compounds that «Mühli» had successfully incorporated into a Swiss caries-preventive dentifrice: Elmex®). So after a few weeks of acclimatization to my new Swiss environment (including finding a room to live in in a city with a terrible lack of available housing), «Mühli» put me together with chief investigators in his department, those whose endeavours he thought might stimulate or otherwise interest me. «Mühli» introduced me to Dr. Hubert Schroeder, whose work with electron microscopic studies in oral structural biology (2) were already well-known worldwide. Schroeder had also employed electron microscopy to decipher the peculiarities of dental calculus formation on human teeth (3), and was at that time just finishing his now-classic book on the mechanism of the epithelial attachment of



After receiving a prize for the first German-language edition of the Color Atlas of Periodontology (Rateitschak and Wolf, 1984), the authors were again pleasantly surprised when the English edition of the book received First Prize from the American Medical Writers Association in 1996. Co-authors Dr. Thomas Hassell and Dr. Edith Rateitschak-Plüss accepted the award on behalf of all authors.

*Thomas M. Hassell, D.D.S., Dr. med. dent., Ph.D.*

- 1965 – 1969 *Dental Student, Indiana University*
- 1967 – 1969 *Research Assistant to Drs. Joseph Muhler and George Stookey, Indiana University*
- 1969 – 1973 *Assistant with «Mühli»*
- 1974 *Dr. med. dent., University of Zurich, Switzerland*
- 1973 – 1974 *Private Dental Practice, Island of Guam*
- 1974 – 1978 *Ph.D. Student, University of Washington, Seattle*
- 1978 – 1983 *Assistant Professor, Periodontics, University of North Carolina*
- 1983 – 1987 *Associate Professor, Periodontics and Anatomy, University of Maryland*
- 1987 – 1995 *Professor and Chairman, Periodontology, University of Florida*
- 1994 *Sabattical Guest-Professor, University of Geneva, Switzerland, with Professors G. Cimasoni and P. Baehni*
- 1995 – 2000 *Director of Research, Sonicare/Optiva Corporation, Seattle*
- 2000 – 2004 *Professor and Chairman, Department of Dental Hygiene, School of Health Sciences, Northern Arizona University*
- 2004 – 2005 *Dean of Graduate School and Associate Director of Research, North Carolina A&T University*
- 2006 *Retired*

gingiva to the tooth surface (4). I discussed with Dr. Schroeder (later Professor in Zurich) the possibility of doing a histologic study of the depth of penetration of a periodontal probe into the junctional epithelium after application of different forces. Schroeder found this idea interesting, but we elected not to pursue the project. Such a study was subsequently published by Svanberg and his colleagues in Gothenburg, Sweden, and I later published a similar study of probing pressure and measured pocket depth with colleagues in Zurich (5). «Mühli» next put me together with Dr. Thomas («Tomi») Marthaler (later Professor in Zurich), an epidemiologist interested in dental caries and its prevention by use of fluoridated table salt (6). Marthaler was a pioneer in the study of dental caries in school children (7), and even developed a new index for scoring caries in clinical trials, an index that is used still today. Having no filial interest in statistics, I decided not to pursue research work with Dr. Marthaler. Then I met Dr. Peter Hotz, one of «Mühli's» graduate students (later Professor in Bern), who was in the process of developing and testing a novel in vivo method for measuring the absorption or adsorption of fluoride into/onto the human enamel surface, using a precise technique known then as «enamel biopsy» (8). Peter and I became, and remain today, great friends, and he introduced me to alpine skiing in the Swiss Alps. But the one interaction that truly stimulated my thinking and interest was with Dr. Jan DeBoever, a visiting scientist from Gent, Belgium. Jan was utilizing radiotelemetry to measure pH of dental plaque in the interdental space in vivo (9), a technique first described in 1966 by Dr. Hans Graf (later Professor in Bern) in «Mühli's» department (10). I learned how to build miniature radio transmitters (Fig. 1), which could be linked to a miniature glass pH electrode mounted in a partial denture framework. We also developed miniature sensors for the in vivo measurement



Author on an off-road motorcycle tour of Ecuador (2013)



The author, Dr. Thomas Hassell (left), together with Prof. Thomas Imfeld on the occasion of a meeting of the Sonicare/Optiva Scientific Advisory Board (SAB) in Salt Lake City, Utah, in 1998. Imfeld was a member of the Sonicare SAB, and Hassell was chairman of that Board.

of temperature, calcium and fluoride (11). Subsequently we fabricated the pH electrodes out of pure antimony (12, 13), and these proved to be more stable in the relatively «hostile» oral environment. «Mühli» hired a young electronic technician for me, Heinz Gabathuler, and I eventually became Chief of the Bioelectronics Section in «Mühli's» department. My first graduate student was a young Thomas Imfeld, who pursued radiotelemetry much further, eventually publishing a book dealing with the use of interdental radiotelemetry to evaluate the caries risk of various foodstuffs (14). Years later, Thomas was selected to occupy the departmental chairmanship originally held by «Mühli» himself!

When I first arrived in Zurich, French was my second language, but Zurich is a German-speaking city and I wanted to learn the language by immersion. I enrolled in the adult night school (Volksschule) and began to read children's books aloud in front of a mirror every day. After three months I was frustrated at my meager progress in conversational German, and bemoaned this fact to «Mühli», my mentor. He told me to tell everybody «Sorry, I don't speak English» («Es tut mir leid, aber ich spreche kein Englisch»). He was right! I was not learning German because all of the Swiss people wanted to practice their English on me! Within a few more months I felt comfortable in German, even a bit of Swiss German dialect («Schwiizerdütsch»). My mentor challenged me even more by asking me to translate his textbook «Einführung in die orale Präventivmedizin» (15) into English («Introduction to Oral Preven-

tive Dental Medicine»). Before I departed Zurich, four years after arrival, I had translated four German dental textbooks into English (15-18), and I continue to translate even now in my retirement, all thanks to the challenges and support provided by my mentor, «Mühli».

In the sixties and before, there existed no Dental Hygiene education/training programs in all of Switzerland. A few Swiss dentists had recruited American hygienists to come to some Swiss cities to practice in private dental offices (Geneva, Basel, Bern, Zurich, others), but these were only a very few. «Mühli» always had an American Dental Hygienist on his staff in the Institute. He encouraged me to try and organize a more formal recruitment program. Together with several American hygienists already practicing in Switzerland, especially Ms. Trisha O'Hehir, I founded the «Central Headquarters for Dental Hygienists in Switzerland», located in the Institute. The DH organizing committee placed advertisements in a large number of dental and dental hygiene journals in the U.S.A., actively requesting applications for positions in Swiss private dental practices. We were quickly deluged with applications! Swiss dentists could then review the applications on-site, and make direct contact with applicants. The effort was a rousing success, and the Central Headquarters lived on long after I left Switzerland. Again, a direct result of the mentorship of «Mühli».

Finally regarding «Mühli's» mentorship, as my language skills improved he suggested that I pursue a Swiss doctorate, using my on-going research as my dissertation project. While the University of Zurich accepted much of my coursework from Indiana University, I would have to take general microbiology, human pathology and oral surgery courses at the University of Zurich in order to earn the Swiss doctorate. The final exams in these courses were oral exams – no written multiple choice questions here! – with just the Professor and his Assistant and me in a closed room. Everything from the entire semester's didactic material was fair game. Oh, and by the way, the oral exams were conducted in German. After a lot of perspiration, I passed all of the exams, and on the basis of these successes and my dissertation «Human tooth pulsation» (19), I received the Swiss «Dr. med. dent.» degree from the University of Zurich in May of 1974, again thanks to «Mühli's» mentorship.

**HANS R. MÜHLEMANN – FRIEND**

«Mühli» was my friend until the day he died. We corresponded and visited throughout the decades of the seventies, eighties and nineties. He was a kind and loving friend, always offering a shoulder to cry on if times turned bad, and advice and counsel when major life decisions had to be made. To close, a few anecdotes: «Mühli» invited me to his home for a live 3 a.m. TV broadcast of the first Ali vs. Frazier boxing match (He provided simultaneous English into German translation of the ring announcer's repartee.). He gave me the keys to his red Triumph TR4 convertible when he knew I had a «big date» for the weekend. When I was working on a new book, he offered me his alpine chalet for a week of secluded writing. He helped me design my wedding invitations! He gave me a television for my studio apartment. He encouraged my poetry writing. He pushed me into whatever professional limelight was available for a young scientist. He put me in a live Swiss National Television special and had me describe my research in Swiss German dialect!



On the Ecuador tour, the author (photo) and colleague Dr. Dennis Yeomans distributed toothbrushes and fluoride-containing dentifrice to more than 500 children in remote mountain villages, where no dental care was available, nor fluoridated water. Dr. Yeomans was a member of the «Mühli»-Team, 1968 to 1969.

To end this historical review of one American dentist's experiences in Switzerland, I have to say that what started out in September, 1969, as a one-year contract, finally came to a close in late 1974. Hans Mühlemann was a great «Chef», an extraordinary mentor, and a wonderful life-long friend.

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#### Contact

Prof. em. Dr. med. dent. Thomas M. Hassell, B.S., D.D.S., Ph.D., C.B.A.  
thomashassell1945@gmail.com

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# Hans R. Mühlemann

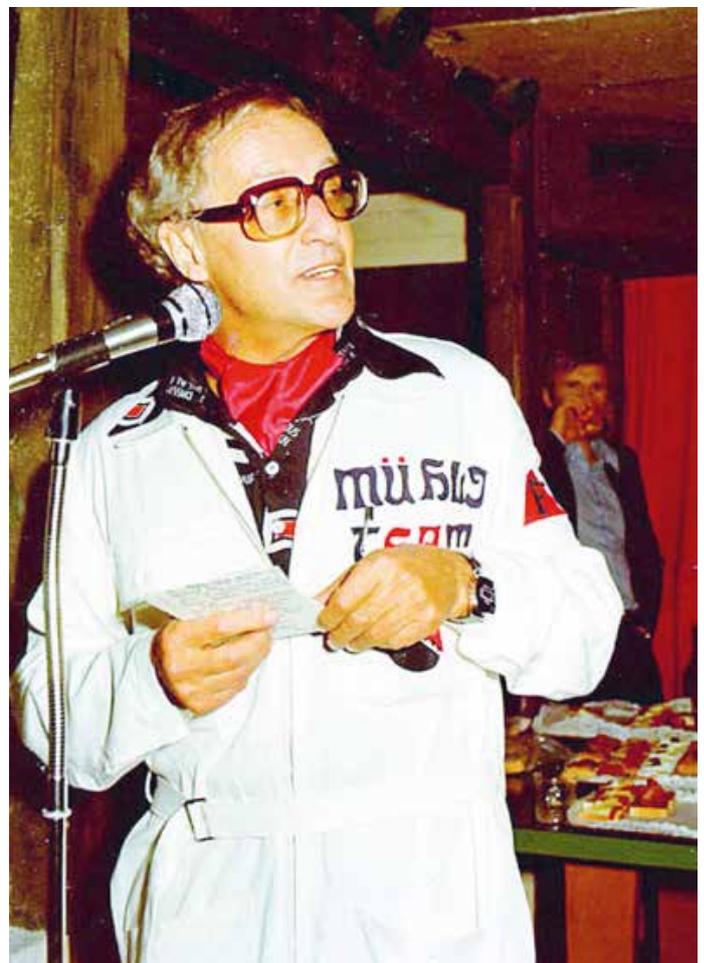
## Who was «Mühli» for us? Personally, as our «Chef», as our Friend?

Thomas Imfeld, Stäfa ZH, Switzerland

The farewell banquet for Professor Mühlemann took place following a departmental automobile rally on September 29, 1983. The banquet was celebrated under the motto «Mühli and his Racing Team.»

My intent in this very personal retrospective after almost 35 years is to help explain why Professor Mühlemann was affectionately called «Mühli» by his co-workers and colleagues, and why he always had a dedicated and sworn team surrounding him, rather than a bunch of egocentric warriors.

**Prototype and foreman:** «Mühli» was a prime example and a unique motivator for all who worked with him. He was the foreman in the truest sense of that word. He demonstrated for us how a person should work. He exhibited an enormous performance output in terms of time, quality and quantity. He was not the «boss» of his racing team sitting on the sidelines and watching the racing cars fly by while radioing to the drivers that they had lost time. He was more like the rabbit in dog racing or the fox in a fox hunt. He was always in front. This was stimulating; but occasionally, on bad days, it was also sometimes frustrating. Nobody could keep up with him. «Mühli» was always busy! Whenever I had to talk something over, I found that the best time to catch him was in his office on Saturday or even better on Sunday morning. It was a safe bet that he was there.



Hans R. Mühlemann wearing an overall emblazoned with «Mühli-Team», presenting his speech at his retirement banquet on September 29, 1983.

*Prof. em. Dr. med. dent. Thomas Imfeld*

1975 – 1978	Graduate Student with «Mühli»
1978 – 1997	Associate Professor with «Mühli» Chief of the Bioelectronic Section Lecturer in Preventive Dental Medicine
1983	Promotion to Professor
1997 –	Full Professor for Preventive Dental Medicine and Oral Epidemiology Chair, Department of Preventive Dental Medicine and Oral Epidemiology
2001 – 2006	Director, Clinic for Preventive Dental Medicine, Periodontology and Cariology
2006 – 2012	Chair and Director, Department of Pre- ventive Dental Medicine and Oral Epide- miology
2012	Retirement, emeritus status

**Idea source and idea filter:** «Mühli» was always full of new, often avant-garde ideas, which he discussed with us. He had a very «good nose» for what was really important now, and what would truly matter tomorrow. At the same time, he was also an excellent filter for ideas. He consistently checked citations from the literature, critically assessed his own ideas and our suggestions for ingenuity and feasibility, and he made quick decisions. But we never felt constrained by his filtering process because he understood perfectly how to make his personal sieve consistently clear for us.



Thomas Imfeld at the peak of the Huayna Potosi in Bolivia, 6,088 meters above sea level. The smiling tooth under the umbrella on the flag attached to the ice axe is the signet for the AKTION ZAHNFREUNDLICH («Tooth-Friendly Action; [www.zahnfreundlich.ch](http://www.zahnfreundlich.ch)). This is a group of personal members, companies and purveyors of tooth-friendly products in the areas of foodstuffs, cosmetics, pharmaceuticals, as well as dental and oral care products. The purpose and goal of the organization, founded in 1985 by Professors Bernhard Guggenheim and Hans R. Mühlemann, is to inform the public about the relationships between oral/dental health and nutrition, the improvement of oral health, and the promotion of tooth-friendly nutrition habits. The group guarantees that the presence of the «smiling tooth» sign means that the product offered for sale is scientifically proven to be safe for teeth.

**Ability to inspire:** «Mühli's» ability to inspire gave each new coworker an initial advantage and a boost to her/his self-worth. «Mühli» met each individual at eye level. We all felt like co-workers and collaborators, not like workmen carrying out somebody else's orders. That gave us wings and the courage to take on new tasks in research. This trust from above led without exception to a formidable level of trust from below. It was, however, not unlimited: If «Mühli's» trust was betrayed, the motto «high flown – low fallen» was quickly observed.

**Ability to listen:** His facility with inspiration was closely associated with his ability to listen. We could go to him with presumptuous, premature or even immature suggestions and ideas and we would always profit from his idea filter. The Chef's «open ear» gave especially to young assistants the feeling – often also only the illusion – of «I also understand,» which was extremely motivational. On the other hand, «Mühli's» ability to listen saved him from the fate of so many «Chefs,» namely from what is known as the «isolation of tyrants,» which occurs too often when colleagues and co-workers only tell the boss what they think he wants to hear.

**Individual leadership style:** «Mühli's» leadership style was embossed by his charismatic personality. «Mühli» possessed and expressed impartial authority through fact-based deliberations and, even more importantly, through the very essence of his character. He was, however, never «authoritarian!» His co-workers felt his authority rather as a kind of force-field that surrounded him and generated new forces in his environment. In this way it was possible for «Mühli» to assign tasks; he never had to give orders. Assigned tasks give co-workers the freedom to act, responsibility, stimulation and motivation. Orders do none of this.

**Promoter/challenger:** «Mühli» was always a tremendous promoter of his co-workers, but never the beneficiary of colleagues' work products. Of his approximately 440 publications, he was sole author of 38%, first author of 27%, and co-author of 35%. He was always prepared to allow his assistants and co-workers to appear as first- or second-author. This gave his colleagues the opportunity to position themselves in the world literature. Such chances and motivations have finally led to a situation in which of 180 assistants (over 30 years!), 18 (10%) have been recruited into university chairs and leadership positions the world over.

**Personal relations:** «Mühli's» relationships to his colleagues and co-workers were very individual. They did not follow any rigid scheme, nor any textbook about «organizational behavior.» Rather, «Mühli's» personal style gave each co-worker her/his necessary free space, and as much propinquity as she/he needed. «Mühli» was not a father, but rather an experienced friend. He always had time and an open door for his co-workers. He never hid behind an appointment book.

**Forever young:** «Mühli» was not a distanced professor, never an unapproachable, gray-haired eminence. Much more he was an open, participatory, youthful person with playful delight in new equipment, fast cars, celebrations etc. All this rendered him so sympathetic, and allowed him to simply be himself.

It was not always easy to work for Hans R. Mühlemann, but it was always humanly enriching. To be a member of the «Mühli Team» filled all of his colleagues and co-workers with pride. All of us felt gratitude towards him. Along with his enormous academic stature, he possessed and exuded a wealth of personal competence and empathy. These traits made it for each person a joy to work with and for Hans Mühlemann. It made us feel really good!

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# Hans R. Mühlemann

## «Mühli» as ‚Chef‘, Team Leader, Friend and Companion in the Dental Practice – Two Former Team Members Remember

Dr. med. dent. Bernhard Lüscher, Elgg  
Dr. med. dent. Heinz Ochsenbein, Winterthur

### Prevention and Team Work

These two terms were prominent in all of «Mühli's» accomplishments, and in all of his life's work; these terms therefore also influenced us in the private practice of dentistry. The three years we spent with «Mühli» participating in various research and working groups taught us, among many other things, team work. We therefore incorporated «prevention» and «team work» into every phase of our dental practice partnership. We were then (and remain today) convinced that ideas created by team interaction, including critical considerations, can create a stimulating workplace atmosphere.

### A dental practice with emphasis on prevention

A clean tooth does not decay; healthy gingiva does not bleed: These two basic concepts of preventive dentistry predominated

during the planning phase of our dental practice in Winterthur in 1978. We dedicated more than a third of the area of our practice to prevention. In addition to two completely equipped DH operatories, we had three so-called «prophy rooms» outfitted with all of the necessary equipment. For our own operatories, we had «rescued» three old dental chairs from the Dental Institute clinic, and had them renovated. They served well for the purposes of patient motivation, information and oral hygiene instruction. What remained was the personnel problem. Dental hygienists were rare at that time; the new DH school in Zurich was the only one in the country. Our own participation as part-time teachers in this school did give us certain advantages, but the few newly graduated dental hygienists were immediately «absorbed» in the dental marketplace. We had to search for possibilities to broaden our practice team; the final solution was the Prophylaxis Assistant (PA).



The «Composite Team» on the occasion of a continuing education course on «Adhesive Dentistry.» Photo from March 1976. Professor Hans R. Mühlemann (left) with Dr. Bernhard Lüscher.

*Dr. med. dent. Bernhard Lüscher*

*1965–1971 Dental student, University of Zurich*

*1971–1972 Assistant dentist in the practice of Dr. Hans Schweizer*

*1972–1976 Assistant with Prof. Hans R. Mühlemann, later teacher in clinical cariology and periodontology*

*1976–1978 Teaching at the University of Connecticut School of Dental Medicine (H. Löe)*

*1978–2013 Private dental practice, together with Heinz Ochsenbein. Later also with Felix Lutz and Fabian Wettstein; teaching under contract with the Dental Society of the Canton of Zurich (ZGZ; today, SSO Zurich) in courses for dental assistants, and continuing education courses. Teaching in the Zurich Dental Hygiene School (DHSZ). Duty as consultant and member of the administrative board of HAWE NEOS DENTAL, Gentilino, TI*



Dr. Heinz Ochsenbein lecturing at a continuing education course on «Adhesive Dentistry,» March 1976.

*Dr.med.dent. Heinz Ochsenbein*

1965–1971 *Dental Student in Freiburg and Zurich*

1971–1972 *Assistant dentist with Prof. Hugo L. Obwegeser*

1974– *Dental Institute, University of Zurich*

1971–1977 *Assistant and Oberassistent with Prof. Hans R. Mühlemann, Dental Institute, University of Zurich*

1975–1977 *Teaching contract, periodontology and clinical cariology, Medical Faculty of the University of Zurich, with Prof. Hans R. Mühlemann.*

*Author and co-author of various publications in the field of "chlorhexidine in dental medicine". Co-worker in mobility measurements of dental implants.*

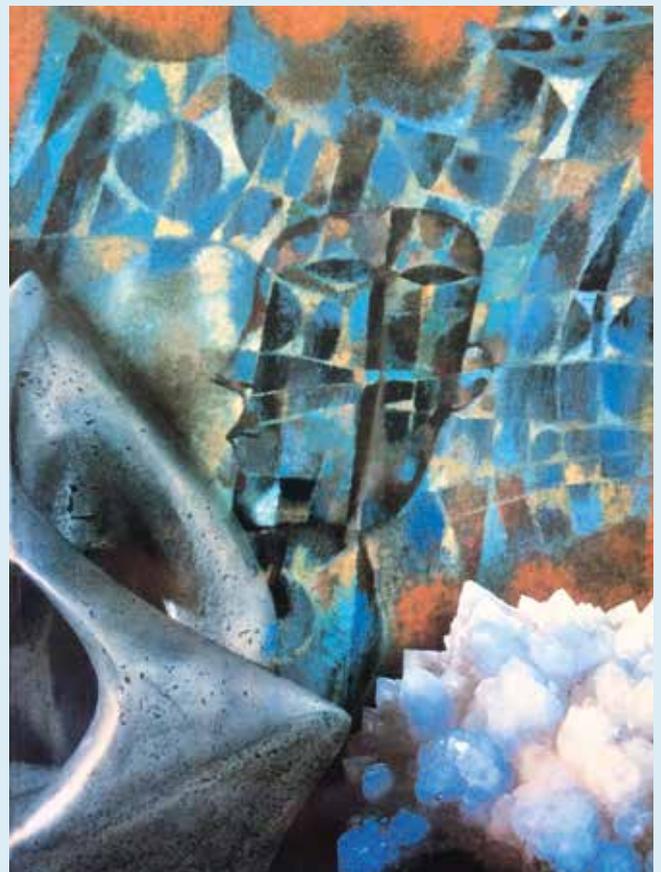
*Co-author of various publications in the area of composite restoration research (Lutz, F., Lüscher, B., Ochsenbein, H., Mühlemann, H.R.: Adhesive Zahnheilkunde, Juris Druck & Verlag AG, Dietikon 1976*

1978–2005 *Co-Proprietor, combined dental practice of Drs. B. Lüscher, H. Ochsenbein, F. Stutz, Winterthur*

### A new profession arises: The Prophylaxis Assistant (PA)!

To create this new position, we had to overcome several obstacles, both political and governmental (1). Working together with same-minded practitioners (mostly former «Mühli» students!), we put together the «APZ Working Study Group for Preventive Dental Medicine,» and laid out a prospective model for teaching and education. Following several discussions among Study Group members, we concluded that the best course of action was to establish a «crash course» at the Zurich Dental Hygiene School on Minervastrasse 99 for the education and preparation of a state-approved number of Prophylaxis Assistants who would receive official diplomas. Subsequently the Swiss Dental Society (SSO) became active in the project, and offered courses for the PA program's curriculum. Finally, the prevention team was complete! Cooperation between the PAs and the DHs was frictionless and without problems: The DHs recognized that they would be relieved from routine duties, and they took very seriously their role as Periodontal Co-Therapists.

Hans R. Mühlemann – Collector and *connoisseur* of art



«Mühli» had many interests; a glimpse into his private rooms demonstrates his preference in terms of painting, sculpture and various collections that cannot be easily categorized: Exceptional, out-of-the ordinary and experimental, maybe even comical. His special love and so-to-say his invention was «Tri-Art»: He put together a painting, a sculpture and a crystal, for example a large smoke crystal from his extensive collection of rocks and minerals, and placed the three objects in a certain 'tense' spatial arrangement. Always using new combinations he was himself always creative. He photographed his creations and was always pleased to display them

### Staff meetings enhance team work within the dental practice team

We incorporated into our practice yet another aspect of «team thinking» from our experiences in «Mühli's» department: the Staff Meeting. We remembered that in «Mühli's» department every Thursday morning at 7:30 there was a Staff Meeting on the «I» floor of the Dental Institute, adjacent to «Mühli's» office. All of the co-workers from the «D,», «I,» and some from «K» (Caries Research) floors assembled, and this demonstrated just exactly how big «Mühli's» department was; it was then still called «Department of Cariology, Periodontology and Preventive Dental Medicine.» «Mühli» went over his meeting agenda, usually with his eyeglasses hanging from one ear. Then each staff member around the table gave her/his report. Discussion revolved around issues of administration, personnel, problems in the student clinical courses. Everyone could feel «Mühli's» leadership style. He gave every co-worker a lot of leeway, but made his demands known to everybody. He had a lot of patience, and he accepted even opposition. If the argument was convincing, he might smile or slap one on the shoulder; when not, the speaker lost!

Our daily work as practitioners remained characterized by the lessons we learned and the experiences we had in «Mühli's» team. We sought to adopt his critical thinking about new developments («Where are the controls?»). We were indeed lucky to maintain our contacts with «Mühli» even after he retired. For many years, we would find copies of scientific publications in the mailbox, when he thought they would be of interest to his former colleagues. There can be no doubt that it was for us a privilege to have the opportunity to have «Mühli» as a teacher and Chef, and later to be able to maintain our friendly relationship with him.

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1. Compare SWISS DENT 7-8, 1981, 20-21



An additional photo from the «Adhesive Dentistry» continuing education course from March 1976: (from left) Dr. Bernhard Lüscher, Prof. Dr. Felix Lutz, Dr. Heinz Ochsenbein.

#### Contacts

*Dr. med. dent. Bernhard Lüscher, Elgg  
parotis@bluewin.ch*

*Dr. med. dent. Heinz Ochsenbein, Winterthur  
heox@bluewin.ch*

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## Hans R. Mühlemann

### Thomas M. Marthaler and Klaus G. König – Two Early Companions – The «Twin Brothers» of Caries Prevention in Switzerland – Remember

Prof. em. Dr. med. dent. Thomas M. Marthaler, Zürich  
Prof. em. Dr. med. dent. Klaus G. König, Nijmegen (NL)

*Tomi Marthaler: The thoughtful strategist and team inspirer; Klaus König: His passionate student. Both 100% to the Mühlemann credo «Prevention is our Priority». Both averse to «drill and fill» dentistry, both pledged*



The epidemiological «twin pair», Thomas Marthaler (left) and Klaus König (right).

During the years 1956 through 1959, we sat together as brothers at a long table, initially on the second floor of the venerable Semper Building at 4 Zürichbergstrasse, and later along the windowed western wall of the new Dental Institute at 11 Plattenstrasse. From 1959 until 1968, we worked there on the uppermost floor, Room K-34, enjoying a panoramic view to the east over the Lake of Zurich and beyond that to the almost always snow-covered Vrenelisgärtli.

### Spring 1956: Important events – New developments

In the early years, «Mühli» was an admirable boss but, because of his strict adherence to principles, he was also a somewhat feared boss. If one of us showed up late for work, we would invariably find a hand-written note from «Mühli» on the chair: «We start work at 8 a.m. around here»! At the latest, «Mühli» himself could be found every morning at 7 a.m. at his desk in the adjacent corner office. Once or twice each day, he would drive the 100 meters to the nearby post office in his Borgward Isabella Coupé to empty his post office box. Because of a previous serious skiing accident, he suffered terrible pain while walking, but he never complained.

The first week of April 1956 was filled with events that lead to new developments. Tomi Marthaler had just returned from an extended postgraduate program in the United States, at the Forsyth Dental Infirmary for Children in Boston, Massachusetts, a philanthropic center for treatment, teaching and continuing education. The primary goal of the center revolved around prevention of dental caries. During his time in Boston, Tomi learned a great deal! Fluoridation of communal U.S. water supplies was in its infancy. Annually, many millions of school hours were lost because of dental problems. At that time, the Forsyth Institute was recognized internationally as the destination for dentists and dental scientists who



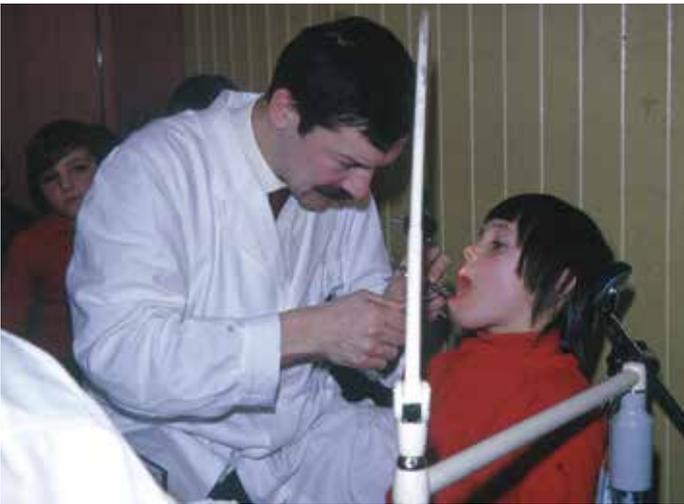
Hans Schmid, chemist at GABA AG, Therwil/Basel, Switzerland

*Prof. em. Dr. med. dent. Thomas M. Marthaler*

- 1949 – 1953 *Dental student, University of Zurich, Switzerland*
- 1953 – 1954 *Dentist, Forsyth Dental Infirmary, Boston, MA, U.S.A.*
- 1954 – 1956 *Assistant in my father's dental practice  
Promotion to Dr.med.dent., University of Zurich*
- 1956 – *Researcher, Department of Preventive Dental Medicine, Periodontology and Cariology, University of Zurich, Switzerland. Worked in research, teaching and in general public health*
- 1955 – 1960 *Experimental research on caries and fluoride*
- 1958 – 1965 *First long-term dental caries studies*
- 1963 – *Periodic assessment of dental health of school children in the Canton of Zurich, and additional studies in other regions of Switzerland*
- 1968 – *Associate Director of the Biostatistical Center of the Medical Faculty, University of Zurich*
- 1969 – 1975 *Assistant Professor of Oral Epidemiology and Preventive Dental Medicine, University of Zurich*
- 1975 – *Full Professor for Oral Epidemiology and Preventive Dental Medicine, University of Zurich*
- 1977 – *Numerous visits as Visiting Scientist for the World Health Organisation (WHO) in Portugal, Spain, Hungary, Greece and many Latin American countries*
- 1995 – *Professor emeritus*

were interested in prevention. Professor Mühlemann recognized that the young Thomas Marthaler had gleaned from Forsyth the knowledge and the motivation to become an ideal collaborator in his department.

Even then, Tomi Marthaler – already a virtuoso clarinetist, member of a jazz band and accompanist for the iconic singer Ella Fitzgerald – did not lose sight of the necessity to study and learn modern research methodology in the USA, in addition to music! Above all, he became an expert in American and British methods for the planning and statistical evaluation of scientific experiments. Supported and accompanied by Professor Arthur Linder (ETH Zürich and University of Geneva; later also University of Lausanne), Tomi quickly became an authority in the area of research/experimental planning. In the first week of April, 1956, the young dentist Klaus König also joined «Mühli's» team. Klaus was tasked with development of dental caries research methods employing animal model systems in the Caries Research Station of the department. Using microradiography, in his early research endeavors «Mühli» had already studied the diffusion of radioactive iodine in dental enamel. From this he had developed the concept of reducing the solubility of dental hard tissue through use of fluoride compounds, whose diffusion could be accelerated and enhanced through use of small, organic «carrier molecules.» For the synthesis of these types of addition combinations – first with the 23 amino acids – «Mühli» garnered the participation of chemist Hans Schmid at the GABA Company in Therwil/Basel, Switzerland. The compounds were first tested in vitro in the laboratory of Dr. Angela Schait in «Mühli's» department, to ascer-



The two authors, both epidemiologists, performing clinical examinations of school children; Left Thomas Marthaler; right Klaus König.

tain their ability to reduce enamel solubility. Successful compounds could then be tested in an animal model, and eventually in human clinical trials. Chemist Schmid also arranged for the transfer of caries-susceptible Osborne-Mendel rats from the US National Institute for Dental Research (Bethesda, MD). Young dentist Klaus König from Bremen, Germany, was tasked first with preparing extracted 6-year molars from school children for the chemical enamel solubility test [Of note: first molars were at that time routinely «preventively» (sic!) extracted], and secondly to set up caging facilities and a breeding program for the rats to be used for subsequent in vivo investigations. The enormous number of nipples for the rats' plastic drinking bottles that «Mühli» had planned were fabricated by «glass blower» König from glass tubing, with frequent assistance from Thomas Marthaler.

### Planning and evaluation of the experiments

«Mühli» himself planned the initial studies with rats, distributing them into various cages according to his original plan. Thomas Marthaler, who at the time was attending Professor Linder's lectures about planning and evaluating such studies, did not agree with «Mühli's» arrangements. Tomi worked in the evening to re-arrange the rats in a block design with randomization. The next morning, «Mühli» reacted indignantly, but after the storm cleared he was chivalrous and fair, and accepted the deliberations of his young coworker Marthaler in the use and application of scientifically correct principles of planning. Young König was deeply influenced, and supported with verve Tomi's study of Professor Linder's examples of planning and evaluation of in vivo experiments. In the summer of 1956 we both received «Mühli's» permission to attend an important Symposium of the Biometric Society at Vöstalpine AG in Linz, Austria, where «steel makers» and other R&D specialists presented and discussed examples of scientific planning. It was on this occasion that the Austrian-Swiss Section of the Biometric Society was founded. Professor Linder was the chairman and soon thereafter brought Thomas Mathaler and Klaus König into the Advisory Board.

With «Mühli's» concurrence, Tomi assumed responsibility for the planning and evaluation of all studies on-going in the department. In the international dental journal *Helvetica Odontologica Acta* (HOA), founded by «Mühli» in 1957, scientifically solid research findings from the department's various research endeavors were published. But that was not enough: «Mühli» gave Tomi the freedom to work in concert with the Data Analysis Center of the University of Zurich. Marthaler subsequently offered his services and guidance more and more broadly to all researchers in the medical faculty of the university.

Thomas Marthaler also quickly undertook analysis of «Mühli's» investigations of the cell division rate in the basal cell layer of the gingiva, and correlated these observations of patients with periodontal inflammation and tooth mobility. Because this deep cell layer was not straight (like the superficial layer) but rather appeared as a deeply undulating wave course, a complicated method of measurement was necessary to measure the length of the cell layer. Marthaler called his relatively simple and straightforward method for accomplishing this measurement of wave-forms «archography.» The «archograph» was a rod with a needle's eye at one end and a reversed sewing needle at the other end. A thread was inserted through the eye and by rolling the rod along the wave-form on a microphoto, the precise length of the row of cells could be determined.

<i>Prof. em. Dr. med. dent. Klaus G. König</i>	
1950 – 1954	<i>Dental student, Universities of Erlangen and Würzburg, Germany</i>
1954 – 1955	<i>Private practice of dentistry, Bremen, Germany</i>
1956 – 1968	<i>Researcher in the department of Prof. Hans R. Mühlemann, University of Zurich, Switzerland</i>
1962	<i>Habilitation for Conservative Dentistry and Caries Research, University of Zurich</i>
1966	<i>Assistant Professor, Caries Research Station, University of Zurich</i>
1968	<i>Offered department chairmanship, University of Munich, Germany (declined). Offered departmental chairmanship for Preventive Oral Medicine, University of Nijmegen, The Netherlands (accepted)</i>
1969 – 1996	<i>Departmental Chairman and Professor, University of Nijmegen, The Netherlands</i>
2005 – 2009	<i>Guest Professor at the Arnhem College, Nijmegen, The Netherlands, Department of Oral Hygiene</i>
1970 – 1987	<i>Co-Editor, journal of «Caries Research»</i>

### «Mühli» – A constantly effervescing source of new ideas

Almost daily, «Mühli» came up with new ideas emanating from his sleepless nights; he stored these ideas in a hand-held Dictaphone, and laid them out the following morning. We discovered these on hand-written notes he left for us. «Mühli's» «open door policy» meant that he was always and quickly available for discussions. We always considered his ideas carefully, but also critically, and «Mühli» was always fair, accepting alternative ideas and concepts. Even in our early work together, Tomi was heavily involved with caries diagnosis as an instrument within oral epidemiology. In 1959, «Mühli» allowed both of us to attend the ORCA Congress (ORCA = European Society for Caries Research) in Hamburg, Germany, where we met many dental scientists, among them Professor Otto Backer Dirks, a microbiologist and caries epidemiologist with whom we quickly became friends. Together with Professor Geoffrey Slack (London), he had founded the «Probe Sticker Club,» which we were also invited to join. While Slack performed caries diagnosis by probing occlusal fissures, Backer Dirks and Marthaler – and in their wake also Klaus König – were advocates of visual caries diagnosis, which Tomi refined into a high quality perfection. Both had recognized early on that valid clinical evaluation of preventive measures would only be possible with precise diagnosis.

### Fluoride tablets for school children – Fluoride additive combinations in dentifrices

One of our colleagues from Emmental presented us with an interesting possibility for a caries study in the mid-1960s. As the school dentist, he had received permission from the communities of Rohrbach and Ehriswil to examine the dentition of all new pupils starting school. Afterwards, he attempted to have the teachers in these two communities distribute fluoride-containing tablets to the children on each school day. He was successful in this attempt in only one of the two communities, after acceptance by the teachers and parents. In 1966, he reported on his gratifying results: For the children in the community who took the fluoride tablets daily, the incremental caries increase over time was significantly reduced in comparison to those children in the «control group» community (no fluoride tablets). Planning experts Marthaler and König reacted with some skepticism: The school dentist was not «blinded,» that is to say he was aware of which children had taken the fluoride tablets and which had not. A reduction in caries was to be expected, so perhaps the school dentist – unintentionally – had not registered each and every tiny carious lesion in all children? The two young Zurich researchers quickly formulated a plan: We would drive our research vehicle – an ancient Citroen «deux chevaux» – into Emmental, and in a «neutral» location between Rohrbach and Ehriswil re-examine all of the children from both communities without knowledge of the children's home locations. The school children themselves were «sworn to secrecy» about their home community, and further sworn to silence. «Mühli» approved the plan and actively supported it. Everyone involved agreed and participated. The 3-day event went off as planned, and was successful. The results were clear, as proven by Marthaler's statistical tests of the detected number of carious lesions: Those children who had taken fluoride tablets daily for five years exhibited significantly fewer carious lesions than those children in the non-fluoride-tablet control group. Caries on smooth surfaces, buccal and interproximal, was prevented more successfully than fissure caries. This distribution and spectrum of caries reduction corresponded well to the findings from contemporary drinking water fluoridation studies in the United States. The most important conclusions from this research experience were:

In contrast to the American studies, which claimed that systemic intake of fluoride was critically necessary during the time of tooth formation if caries prevention were to be realized, the Marthaler/König study clearly showed that even after tooth eruption local (topical) fluoride application can be very effective. With the school children of Emmental, fluoride tablet ingestion started only in the seventh year of life, when the 6-year molars and anterior teeth had already erupted. That was a very welcome stimulus for «Mühli», who had from the outset predicted that the topical application of fluoride combinations and fluoride-containing dentifrices would be effective in preventing dental caries.

In the interim between 1956 and 1959, the synthesis of fluoride addition-combinations by Hans Schmid, and their testing in vitro and in animal experiments in the Caries Research Laboratory at the University of Zurich continued without interruption; over 300 compounds were evaluated. Based on the promising results from studies in rats by König, and also upon promising attributes such as stability and compatibility, attempts at formulation of a fluoride-containing dentifrice were initiated. The fluoride compound chosen was the combination of two fluoride addition-combinations: #242, cetylamine dihydrofluoride and #297, an ion-active ethoduomine hydrofluoride. Soon thereafter, Thomas Marthaler initiated a 7-year clinical-epidemiologic study with school children who were provided with this new dentifrice. The product was named *elmex*<sup>®</sup>, and it entered the marketplace in 1963 by GABA AG, Therwil/Basel, Switzerland. Its caries-preventive efficacy in humans was demonstrated by Marthaler's long-term clinical trials. This represented an extremely successful contribution to «Mühli's» goal: «More oral health for more people.»

During the final two years of our collaboration, 1967 and 1968, we were increasingly independent and self-supporting. That meant, for Thomas Marthaler, that long before 1977 when he formed a «Station for Applied Prevention» he would be more and more deeply involved with school-based caries prevention. With excellent cooperation from the Health Director of the Canton of Zurich, Tomi brought politics so far that regulations were instituted: These regulations demanded that all schools initiate specific preventive dental measures or risk losing Federal financial subsidies. At this same time, Klaus König completed his 100th rat caries study (dealing with the cariogenicity of soft drinks favored by humans). König received a call to accept a chairmanship at the University of Munich, which he rejected, but he accepted a call to chair a more research-oriented department at the University of Nijmegen, and had to say good-bye to Tomi Marthaler, to «Mühli» and to Zurich at the end of 1968.

The good and friendly relationships and the exchange of scientific progress have been maintained over the ensuing decade.

#### Contact

*Prof. em. Dr. med. dent. Thomas M. Marthaler*  
Bellerivestr. 21  
CH-8008 Zürich  
Switzerland  
[thomas.marthaler@uzh.ch](mailto:thomas.marthaler@uzh.ch)

*Prof. em. Dr. med. dent. Klaus G. König*  
Weezenhof 2906  
NL-6536 HM Nijmegen  
Netherlands  
[k.konig@kpnmail.nl](mailto:k.konig@kpnmail.nl)

SWISS DENT 2/2018 – Special issue in remembrance of the 100<sup>th</sup> birthday of Hans R. Mühlemann (\*August 26, 1917 – † June 1, 1997)

# Hans R. Mühlemann

## Remembering Professor Hans R. Mühlemann and My Time at the «Zahnärztliches Institut der Universität Zürich» in 1971

Anna Matsuishi Pattison, R.D.H., M.S., Los Angeles, California, U.S.A.

### Dr. Hans R. Mühlemann – Mentor and Agent of Change

The famous anthropologist, Dr. Margaret Mead, once wrote, «Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.» Dr. Hans R. Mühlemann epitomized the essence of this quote. His life and his legacy are proof that it is indeed possible for a single person to influence a group of committed people, and affect meaningful, significant change in this world.

I am quite certain that «Mühli» understood this, believed it, practiced it and showed us all by example that ideas are not only dreams. Good ideas can become goals that can and do come to fruition if one is dedicated to working as tirelessly as he did to achieve them. As a young dental hygiene student at the University of Southern California from 1963 to 1967, my goal was to make a difference in the treatment of periodontitis and to decrease the incidence and prevalence of periodontitis in the United States. During my first months in the clinic, I knew that I did not want to work only in



A departmental party in the Dental Institute. From left: Dr. Werner H. Mörmann, the author, Dr. Adnan Al-Jazrawi, Dr. Heinz H. Renggli, Dr. Oreste Balmelli.

private practice. I wanted to accomplish more. I pursued a Master's Degree in Dental Hygiene at Columbia University in New York City. After teaching at U.S.C. for two years, I had the opportunity to participate in a research project funded by a grant from the U.S. federal government at U.C.L.A. in 1970, and I wrote the first instrumentation textbook for dental hygiene (1). At the end of that year, I decided to write letters to several universities in Europe with hopes of securing a teaching position and living abroad. To my surprise and delight, the first letter I received was from Switzerland. Dr. Hans R. Mühlemann invited me to join his team in the Dental Institute, University of Zurich.

### Memories of Zurich

On this particularly gray day in November, I am working as usual in the «Abteilung für Kariologie, Parodontologie und Prävention» at the «Zahnärztliches Institut der Universität Zürich». I will be doing deep scaling and root planing on some of the most difficult periodontitis patients that I have ever seen in my life. The treatment of these very challenging patients forces me to perfect my hand instrumentation with Gracey curettes. The daily work on these severe periodontitis patients allows me to develop my clinical skills more than at any other time in my career.

*Anna Matsuishi Pattison, R.D.H., M.S.*

- 1963 – 1967 *Dental Hygiene Student, University of Southern California*
- 1967 – 1968 *Master's Student, Columbia University, New York*
- 1968 – 1970 *Assistant Professor, Department of Periodontics and Dental Hygiene, University of Southern California School of Dentistry, Los Angeles*
- 1970 – 1971 *Associate Director for Dental Auxiliary Occupations, University of California at Los Angeles, Allied Health Professions Project*
- 1971 – 1972 *Dental Hygienist and Instructor, Department of Cariology, Periodontology and Oral Prevention, Dental Institute, University of Zurich, Switzerland*
- 1972 – 1973 *Assistant Professor, Department of Periodontics, University of Southern California School of Dentistry, Los Angeles*
- 1973 – 1975 *Assistant Clinical Professor, Periodontology, Tufts University School of Dental Medicine and Clinical Instructor, Forsyth School for Dental Hygienists*
- 1975 – 1979 *Assistant Professor of Periodontics and Dental Hygiene, University of Southern California School of Dentistry, Los Angeles*
- 1979 – 2012 *Associate Professor, Department of Dental Hygiene, University of Southern California Ostrow School of Dentistry, Los Angeles*
- 1984 – 1989 *Chair, Department of Dental Hygiene, University of Southern California School of Dentistry, Los Angeles*
- 2002 – 2012 *Editor-In-Chief, Dimensions of Dental Hygiene*
- 2000 – Present *Co-Director Pattison Institute*

In addition to working in the «Poliklinik», I am the dental hygienist for one of the early chlorhexidine studies being conducted by Dr. Heinz H. Renggli and Dr. Hubert E. Schroeder (2). The penetrating dark brown stain on the roots of the research patients who are rinsing with the higher concentrations of chlorhexidine is so deep and tenacious that it is hurting my hand and I fear that I am removing too much root structure.

Suddenly, one day, Dr. Ulrich P. Saxer comes into my operatory and says that the «Chef» wants to see me immediately. Since I am treating a patient, I say, «I can go later when I am finished here.» Dr. Saxer says, «No, no. When the «Chef» says he wants to see you, you must go right away. Tell your patient that you have to leave now.» I am almost shaking as I hurry up the stairs to Dr. Mühlemann's office. Did I do something wrong? Is he upset about how I am treating the patients? Is he going to fire me?

I am relieved to see that the «Chef» is in a good mood today. He greets me with a huge smile that makes his teeth seem as prominent as the large black square frames of his glasses. He holds up a brand new copy of my first book on dental hygiene instrumentation (1) and says, «I just received this new book from a friend in the States. Did you write this book? It says the author is Anna Matsuishi Pattison, but can this be you? You are so young!» I say, «Yes, I am only 24 years old but I spent a year working on this book before I moved here to help you establish the first dental hygiene school in Switzerland. I have been anxiously waiting to receive my first copy but you have gotten it before me!» Then he says, «We are not planning to start the dental hygiene school for at least two years. I think you need to be actively teaching, doing research and writing books back in California rather than only treating patients in our clinic.»

Building on the foundation of my experiences in «Mühli's» department and re-energized by the confidence that I had gained from him, I returned to the University of Southern California (U.S.C.) School of Dentistry in Los Angeles to teach dental hygiene and periodontics again. From 1973 to 1975, we moved to Boston where I taught in the Periodontics Department at the Tufts University School of Dental Medicine and the Forsyth School for Dental Hygienists. After returning to U.S.C., I wrote a new book, Periodontal Instrumentation, in 1979, with my husband (3). In 1984, I became Chair of Dental Hygiene and published the second edition of our book in 1992 (4). We have also written chapters on instrumentation in the last eight editions of Carranza's Periodontal Therapy, the most widely used periodontics textbook in the world (5).

The motivation for all my teaching and writing after I left Zurich was directly influenced by my relationship with «Mühli» and his team, because the Institute was a unique place where anything was possible. The research and accomplishments of «Mühli's» team showed me that a goal as lofty as eliminating dental and periodontal disease in an entire country was not a crazy idea. It could be achieved by the right hard-working people with the right motivation and desire to make a lasting difference. I would never have written more after 1971 if I had not been exposed to «Mühli» and his colleagues. I often stay up late nights with my writing, and I remember Dr. Mühlemann and how hard he would always work at night and on weekends. He had an incredible work ethic. «Mühli» motivated me by example because he was a giant in his field who had boundless energy and was constantly dedicated to his work whether it was teaching, lecturing, writing, doing research or simply listening and talking with his students.

I retired from full-time teaching in 2002 but I continue to teach part-time and participate in periodontal research. From 2002 to 2012, I served as the Editor-In-Chief of «Dimensions of Dental Hygiene», a new clinical journal which is read by 70,000 dental hygienists in the U.S.A. (6). In 2013, I created the Pattison Institute website with fourteen hours of instrumentation videos for students and practitioners. (7)

Today, I am still working tirelessly toward my goal of decreasing the tremendous amount of periodontal disease in America and in the world. This is the same goal that «Mühli» and I shared and



The author with her VW «Käfer» («Bug»); in 1971, the red stripe on the license plate signified «Driver is a foreigner», and the number 787 signified that Anna Pattison was the 787th foreigner to receive a license plate that year in the Canton of Zurich!

discussed while I was in Zurich. It is the goal that he encouraged me to pursue when I left Zurich forty-six years ago. Since I began as a young instructor and after all my years of teaching and writing, Dr. Mühlemann's wise words of guidance still resonate. His vision of the future and his dedication to the profession have been a constant inspiration to me throughout my career.

### Memories of Colleagues

Dr. Mühlemann had a vision of elevating prevention and periodontics so that every Swiss citizen would have less caries and less periodontal disease. Through his research, publications, and mentorship of students and colleagues, «Mühli» advanced the development of fluorides, dental hygiene schools, preventive programs in schools and many more projects to succeed in dramatically improving dental health in Switzerland.

Dr. Ulrich P. Saxer, Dr. Werner H. Mörmann, Dr. Heinz H. Renggli, Dr. Markus Germann and Dr. Thomas Hassell were all my colleagues in 1971. Our exposure to «Mühli» early in our careers was very inspirational because his ability to mentor and encourage us was special. Each of us has had a lifelong career of contributing to the advancement of dentistry, periodontics and prevention. All of us share a particular devotion to the ideals that «Mühli» instilled in us with his charismatic leadership so many decades ago.

I had less time with Dr. Mühlemann compared to the others but I very much appreciated how he treated me with respect and always took me seriously. Subsequently, when faced with various obstacles, I always behaved in a polite and professional manner because I reflected upon how Dr. Mühlemann had always treated me with dignity. I continued to keep in touch with Dr. Saxer over the years because it gave me hope. I knew that if progress was still being made by «Mühli's» team to decrease caries and periodontal disease in Switzerland, it could be possible to make that same progress in the United States.

### Final Thoughts

Few people in life leave one with a lasting impression of greatness. Professor Hans R. Mühlemann left that impression on everyone who had the privilege of working with him. His vision, leadership, genuine caring and mentoring of so many graduate students and colleagues has greatly improved the dental health of all Swiss citizens and of people throughout the world. As we honor him on this occasion of his 100th birthday, let us all remember that the life work of Dr. Hans R. Mühlemann lives on in each of us who knew him, greatly admired him and continue to follow his lead.

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### Contact

Anna Matsuishi Pattison, R.D.H., M.S.  
[apattison@pattisoninstitute.com](mailto:apattison@pattisoninstitute.com)

# Orthopädie – Traumatologie – Chirurgie Arthroskopie – Sportmedizin

**SWISS MED 1/11 (208 Seiten) Gespräche/Beiträge in SWISS MED aus den Jahren 1979 bis 2010**

CHF 80.– + MWSt. (Schweiz) + Versandkosten

### Editorial

Prof. Dr. med. André Gächter

Facharzt für Orthopädische Chirurgie und Traumatologie des Bewegungsapparates

Berit Klinik, 9052 Niederteufen (Schweiz)

Zitat aus dem Editorial:

«In diesem Erfahrungsschatz (SWISS MED 1/11; Red.) finden sich so viele Beiträge von prägenden «Grössen», auch von umstrittenen Persönlichkeiten oder Weggefährten, die ohne ein grosses Aufheben davon zu machen bedeutende Weichen gestellt haben: Eine wichtige Fundgrube für alle, die sich für die Entwicklung der Orthopädie und Chirurgie – sowie deren Unterspezialitäten – interessieren.»

### Gespräche / Beiträge

Auf mehr als 200 Seiten findet die Leserin/der Leser

eine Kompilation der in SWISS MED seit der Gründung der Zeitschrift im Jahre 1979 bis und mit 2010 veröffentlichten Live-Interviews mit den damals aktiven Persönlichkeiten.

Zitat aus dem Editorial:

«Wir finden auch Perlen von Interviews und Beiträgen in dieser Ausgabe von SWISS MED (1/11; Red.) zu Themen wie der Entwicklung der Osteosynthese, der Arthroskopie, der Thromboseprophylaxe, der Technischen Orthopädie und Sportmedizin an den verschiedenen Kliniken von Fribourg bis nach St.Gallen.»

**VERLAG DR. FELIX WÜST AG**, In der Hinterzelg 4, CH-8700 Küsnacht ZH, E-Mail [felixwuest@bluewin.ch](mailto:felixwuest@bluewin.ch)

SWISS DENT 2/2018 – Special issue in remembrance of the 100<sup>th</sup> birthday of Hans R. Mühlemann (\*August 26, 1917 – † June 1, 1997)

# Hans R. Mühlemann

## My Time with «Mühli»

Thomas Reich, Schwerzenbach ZH, Switzerland

### First Impression

With his eyeglasses hanging from one ear, Prof. Mühlemann was rummaging through a mountain of paperwork on his desk as I was ushered into his office. He seemed to be almost unaware of my presence, but fired off his first question: «Have you ever published anything?» I was a bit irritated by the tone of his question, but stumbled through a response, relating that as an electronics engineer in private industry I was obliged not to publish. With a dismissive nod, he interrupted me and acknowledged that I must be here to interview for the position of an electronics engineer that had been advertised for the Bioelectronics Section in his department on May 6, 1975.

The Bioelectronics Section was located on the top floor of a new building located immediately adjacent to the Dental Institute, at 14 Plattenstrasse, Zurich. That floor of the building had only recently been added to the existing two floors. I learned later that he had invested the prize money from his highly-regarded Otto Naegeli Award for the construction and equipping of the new space, which permitted him to expand his research arena.

In the middle of the laboratory there stood a huge Olympia espresso machine and all of its accouterments. This beast had been a gift from «Mühli,» «...so that nobody would fall asleep during working hours.» The machine quickly became the lab's communication center. When it began to huff, puff and gurgle, everyone gathered around to take a coffee break. All of the staff regarded



The author, Thomas Reich – «Mühli» called him Tomreich – (right) and Thomas Imfeld – «Mühli» called him Thomfeld (left). This photograph was taken around 1978.



The author, Thomas Reich, Prof. Mühlemann's «Right Hand Man» for everything mechanical, electronic, hard- and software (Photo from 1978).

Chef openly but with respect. I recognized and appreciated the relaxed atmosphere. In the «modern» American manner, «Mühli» addressed his employees using the formal German *Sie*, but by first name. He proudly pointed out to me the veritable arsenal of laboratory research equipment and apparatus. Visually dominant in the lab was a monstrosity of a Beckmann multi-channel recorder dating from the 1960s.

### «Breaking in»

At that time, the most important job was to make certain that the pH-telemetry equipment was functioning reliably. «Mühli» emphasized the point: «Without reliable pH-telemetry, we can't carry out the intraoral pH measurements required by companies who seek the «Safe for Teeth» logo, and we can't pursue further research in the area of human plaque pH. Several other unfinished electronic construction projects were also there, as well as a highly skilled precision mechanic, with whom I almost immediately developed collegial rapport. My level of interest was awakened! When I accepted the position in the autumn of 1975, «Mühli» told me to make myself at home, get to know the place, and take whatever time it took to acclimatize to the laboratory environment. Of course at that time I did not know that a new employee's productivity during the «break-in» period was being closely observed, which ultimately gave Mühli enough information to quite definitively give



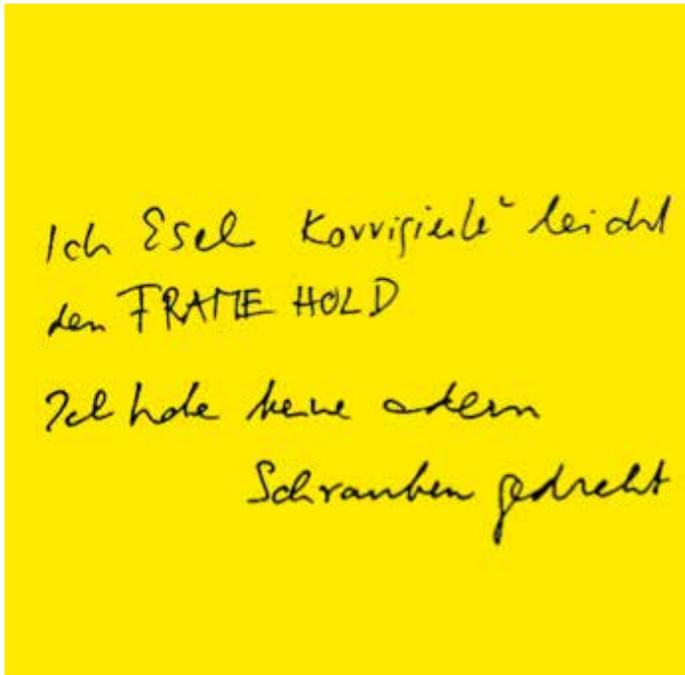
«We are falling behind. The Americans are electronically ahead of us!!» The first IS-FETs (special transistors) had appeared, but proved not to be useful for our purposes. «Mühli» was comparing our 2-man laboratory to large American companies – no limits!



«Thomas Reich: Build apparatus immediately. Would sell like hotcakes!» This project dealt with an anti-bruxism device to be worn in the ear like a hearing aid. When the patient began to brux, the device would emit a «peeping» sound. We built the device, but patients with bruxism could not sleep with it!

#### Thomas Reich

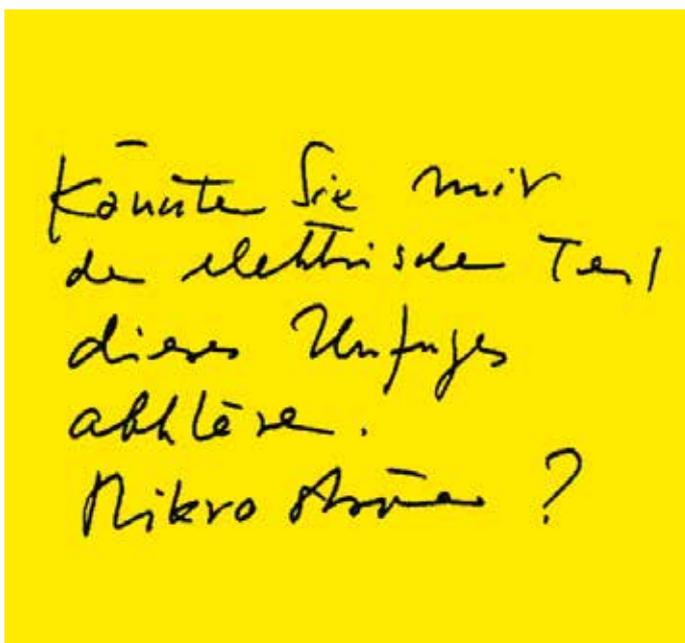
- 1966 – 1967 Three semesters as a medical student, University of Zurich
- 1968 Following military service, intensive rock band activity (guitar and speaker fabrication); various positions in industry
- 1974 – Diploma in electronics from «The Technikum Winterthur»
- 1974 – Development engineer, Zellweger Uster, ETX Department
- 1975 – 2011 Electronics engineer in the Bioelectronics Section under Prof. Hans R. Mühlemann and his successors. Development of measurement devices and systems (hard- and software)



«Silly me, I made a tiny correction on the FRAME HOLD. I didn't touch anything else!» He had «un-adjusted» his mini-television.

a thumbs-up or a thumbs-down. My breaking-in time went by quickly, and came to an abrupt halt. I was called to Chef's office. He said he had received complaints, but did not want to say from whom. I was always relaxed, and never walked around in a white lab coat! This information must have gotten to Chef via his Oberassistent, Dr. Felix Lutz.

Lutz had regarded me with a suspicious eye more than once, and the mechanic in the lab told me: «He doesn't like people with beards, anyway.» In the mean time, I had modified a profilometer so that it could be used by Lutz to complete his advanced dissertation. Two days later, I was again called to «Mühli's» office. He beamed at me with a broad smile and said «I have been informed that a break-through has been accomplished. You can walk around



«Can you clarify for me the electrical portion of this sheer nonsense? Micro-jammer?»

Even Tomreich's abilities were exceeded.

any way you like; you have a free hand in all respects.» Everything was clear: «Mühli's» thumb was pointed up, and it stayed that way. One would have to deeply disappoint «Mühli» before he would change his initial assessment of a co-worker. We were soon able to stabilize the functioning of the pH-telemetry operation, and program our computer for data analysis, and the universe was completely in order!

### «Mühli» and Electronics

«Mühli» was an enthusiastic fan of modern electronics and telecommunications. He possessed the largest arsenal of electronic gadgets that I had ever seen. From electric letter openers, to pencil sharpeners, to mini-TVs, long-distance receivers, electroshock devices and radio scanners. He loved listening to chatter on the police scanner. One of his numerous secretaries procured all of the newest gadgets as soon as Chef gave her an advertisement he'd cut out of the newspaper. Of course, it fell to me to keep all of these devices in working order at all times!

He always had a great hunger for the latest electronic measurement devices for research. Innumerable anti-bruxism devices, pain generators for studies of analgesics, iontophoresis apparatus, devices for measurement of tooth mobility and reflectometers were fabricated from scratch. The list was almost endless.



«Once again: KAPUTT! I threw the packaging in the trash. When can you fix this thing?!»

«Mühli's» early version of today's SMS messages consisted of hand-written, usually colorful 3M Post-It notes with questions and orders. I have reproduced a few here as examples of the hundreds he wrote.

The earliest personal computer developments occurred during my time with «Mühli.» The first computer we had in the bioelectronics lab was a Commodore PET with 8k RAM, tape cassettes and a programming handbook, which we acquired in 1980. We programmed the first software for data reduction and analysis. Data entry was by means of a huge HP-digitizer with a transparent surface. It was possible to project images from behind, and subject the recovered data to statistical analysis with appropriate software

in the computer. Subsequently, we got hold of the CBM8032 with diskettes, and we were able to record the pH-telemetry curves with a plotter. «Mühli's» graphic artist was not delighted that I thereby took over part of her work!

In 1982, we developed the capability to view the pH curves directly on a computer screen using a graphics board. Swiss National Television produced a TV program reporting on intraoral pH telemetry, and was enthusiastic about this modern technology. «Mühli's» own bounding enthusiasm for every new advance was also stimulating. Included was his patience with the often unconventional working times of his project developer, so he could be creative day or night. Unfortunately, the first McIntosh computer appeared only in 1985, two years after «Mühli» had retired into academic emeritus status. The biggest crisis we ever experienced with «Mühli» occurred shortly before his retirement. Lasers were all the rage during the early 1980s. We also experimented with laser devices to examine and probe the topography of the tooth surface. The test restorations were moved by computer guidance. «Mühli» was immediately enthusiastic, and delighted that we would be the first to possess and employ laser technology. Unfortunately, it soon became evident that the laser beam actually penetrated both enamel and acrylic restorative materials. It was therefore impossible to make accurate measurements in the  $\mu$  range. We equipped the Z-axis with a precision tip. This made it possible to examine the teeth

even when they were wet. When «Mühli» heard about this, we received a written protest from him: «Everybody kept me in the dark about this!» Only at this moment did we realize that he had already announced that the laser was a major breakthrough in the accurate measurement of abrasion. Finally in 1983 we were able to perform precise 3D measurement and configuration at the  $\mu$  level of accuracy to measure abrasion of tooth hard structure and restorative materials surfaces. When «Mühli» saw the first results emanating from the measurement device that I had invented, he quieted down (fortunately for us!). At the annual meeting of the AADR in Cincinnati in the Spring of 1983, six American universities expressed the desire to purchase one of our «3D Tooth Scanners.» Following his retirement and for more than 10 years, I continued to provide «Mühli» with private technical assistance for his immense arsenal of electronics and computer equipment. He permitted me to personally look after his enormous collection of devices and gadgets.

**Contact**

Thomas Reich  
tomreich@ggaweb.ch

# ARTHROSKOPIE – GELENKCHIRURGIE

## SWISS MED 2/12

### Aufgelegt zum 29. Kongress der AGA Gesellschaft für Arthroskopie und Gelenkchirurgie

Zürich, 13.–15. September 2012

Geleitwort von Prof. Dr. med. Roland Becker (Berlin), Präsident der AGA

**SWISS MED 2/12 (64 Seiten)**

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SWISS DENT 2/2018 – Special issue in remembrance of the 100<sup>th</sup> birthday of Hans R. Mühlemann (\*August 26, 1917 – † June 1, 1997)

# Hans R. Mühlemann

## My Memories of Working with «Mühli»

Prof. Dr. med. dent. Heinz H. Renggli, Malden, The Netherlands

*It must have been in 1962, during the final year of my dental clinical education. I had just finished very carefully preparing a cavity on 36, the mandibular left first molar, and had positioned and secured the matrix band retainer. Suddenly there was a commotion in the clinic, and my classmate in the adjacent operatory grabbed my attention: «Mühli is in the clinic!» This was not something that happened every day in*

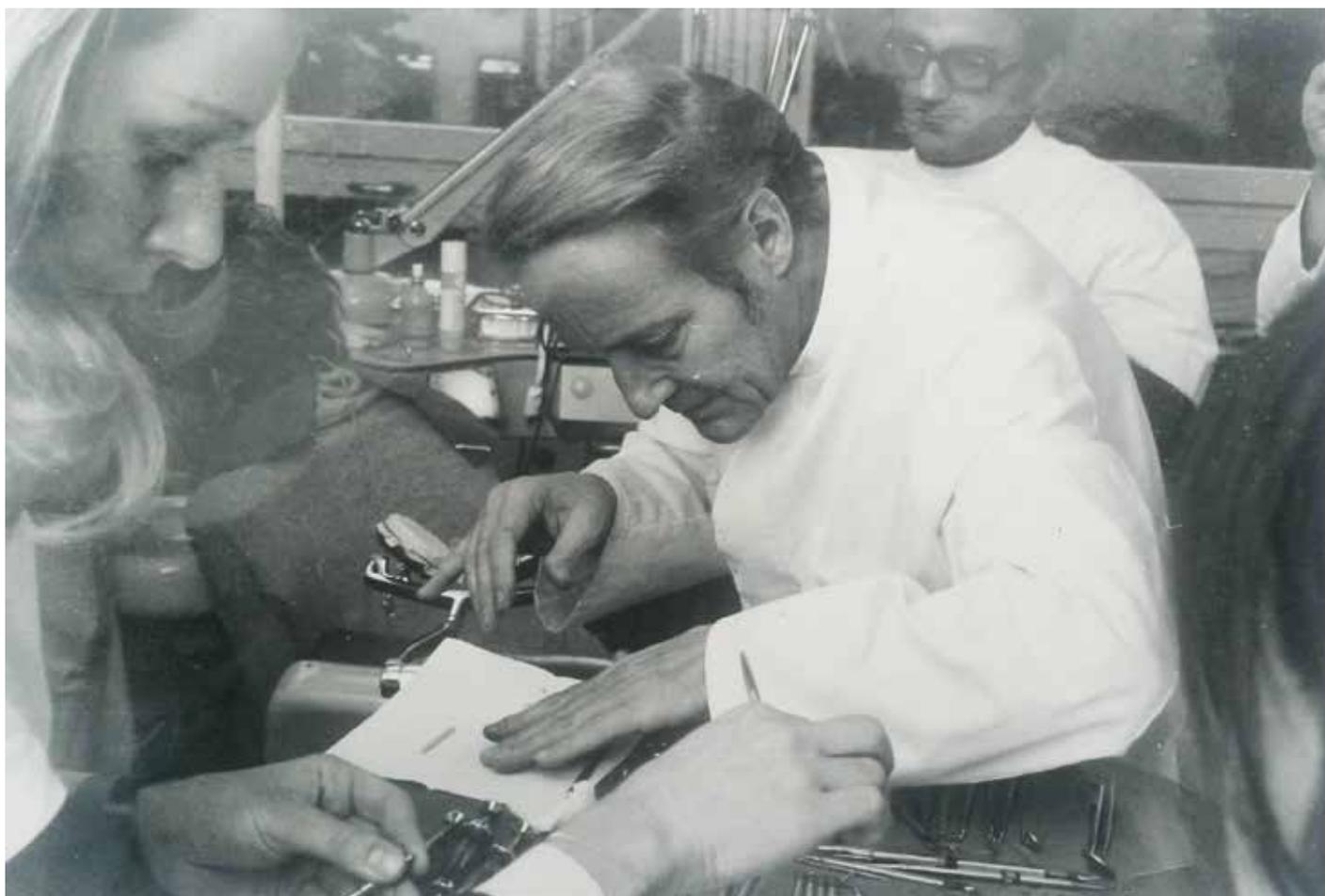
*the practical student clinic. I looked around the room, confirmed his presence, and suspected that he would come to the operatory in only a few minutes and examine «my» patient. As quickly as that thought crossed my mind, he headed straight for me. I had only enough time to straighten up my instrument tray and to inform my patient that the Professor would personally inspect the cavity preparation.*

### Mühli's motto: Treat the entire patient – not just some isolated pathological condition

After briefly greeting the patient, and with a friendly nod in my direction, Mühli picked up the mouth mirror, used it to illuminate the patient's oral cavity, put the mirror back onto the bracket table, took the patient's chart in his hands and asked me with an inquisitive look: «I'm certain that you noticed the erythema on the hard palate in the region of teeth 15/16»? Then, with an expression of surprise, he added: «Or not?»! – Erythema on the hard palate? I had spent almost all morning preparing the cavity on 36 for a restoration. I really had no time for an examination of the oral mucosa! «No, I did not notice it,» I responded, «all of my attention was dedicated to the cavity preparation on 36.» «Good,» he said, «I can understand that, from your point of view. But here sits a patient who has put his trust in you, and not only for your perfect performance of today's restorative therapy. He trusts you – and has the right to expect from you – that your work will encompass the health of his whole mouth and not just the repair of carious lesions.» Mühli immediately informed the patient that the erythema he referred to was of no clinical importance or relevance, and that the clinical instructor and student Renggli would provide detailed information about the reddening after the restoration had been successfully completed. Mühli further informed the patient that the student and the clinical instructor are obligated to concentrate attention on the whole patient – both now and later as practicing dentists – including not only a tooth that requires a filling, and not only gum disease or a local lesion on the oral mucosa. The patient is always the primary concern, whether he presents with a local or general medical condition; a local pathologic alteration must never be considered in isolation. To me personally, Mühli said as he moved on to the next student's operatory: «Here are three textbooks dealing with pathologic oral diseases. You should read them and study them, and apply the knowledge you absorb from them.»

### Mühli stimulated us to become independent thinkers through reading of and interpretation of the scientific literature

During my early dental education, this very valuable personal meeting with a teacher – in this case with Mühli himself – made me aware, then and after many years of working closely with him, of one of his very special characteristics: Stimulation towards independent learning by reading and interpreting the scientific literature. Mühli himself revealed his own enormous hunger for knowledge, which he attempted to quench through continuous analysis of the literature. He also possessed a broad spectrum of clinical knowledge, and upon this he was able to base his diagnoses with certainty. Later, as I pursued my own continuing professional education in Mühli's department, it became clear to me that it is only with sound basic knowledge of the myriad of oral diseases that a clear differential diagnosis of local and systemic pathological alterations can be achieved, and proper treatment provided. For myself, as a young student but also later during my initial years as an evolving educator, I had to come to the conclusion that, lacking such knowledge, I was not yet clinically masterful, and that I still had a lot to learn. On that day in the clinic, Mühli was of course correct: Together with my clinical instructor and only after I had read and absorbed the relevant literature could I be in a position to correctly assess the nature and etiology of that patient's palatal erythema. He arranged it so that the clinical instructor would peruse the appropriate documentation, and would make a report at the next meeting of the clinical staff concerning that patient's mucosal erythema. Here I can acknowledge a second important characteristic exhibited by Mühli: His excellent ability to delegate to his assistants as many tasks as he felt they could carry out to solve a specific problem, while giving them the time, space and stimulation for the creation of new ideas and the identification of new challenges. The things I learned during my years with Mühli in Zurich – clear definition in diagnosis and delegation of appropriate tasks to co-workers – I was later able to incorporate thoroughly into my academic profession, all with deepest gratitude to Mühli.



«Mühli» in full action as he prepares the wound dressing after a «Chef-Op.» Of note: At that time, dental surgeons did not wear rubber gloves! This photograph was taken in 1972-1973; the AIDS epidemic came on in 1982-1983. The expression on Mühli's face – a typical pose for him – leads one to the conclusion that he was satisfied with the results of the operation. Left in the photo: Ms. Christine de Trey, today the wife of the author. Right in the background (wearing glasses) Assistant Adnan Al-Jazrawi, who today practices dentistry in Widnau (AG) with his son, Dr. med. dent. Adrian Al-Jazrawi.

The basic science concepts and the new ideas and treatment strategies I learned during my early academic life made it impossible for me to enter the private dental practice partnership founded by my grandfather

Toward the end of my years as a dental student and young teacher, I began to think seriously about my future in the profession. In Lucerne, Switzerland, my grandfather had established a private dental practice, which had been propagated over the years by his three sons, so it was naturally assumed that after I successfully passed the requisite board examinations I, as a young dentist with an excellent education and new ideas, would take over for the now somewhat aged practice team. It seemed to be generally accepted by all that a more youthful and fresh leadership would be in a better position to confront more contemporary dental problems while incorporating then-novel therapeutic methods. During the final years of my dental education, I made several attempts to involve myself in the private practice, but I had to come to the somewhat drastic conclusion that the treatment strategies I had learned and those of my predecessors were too widely disparate. The routine, often very radical prosthodontic strategies literally frightened me! From Mühli, I had learned «Until it doesn't work anymore,» a primary and secondary strategy wherein preventive measures had to always be at the top of the treatment plan; prosthetic measures, while frequently necessary, were relegated to secondary status. I sought this kind of dental medical practice, but I did not find it in the family practice where I was expected to be a future participant and leader. It quickly became clear to me that, after passing the board exams,

the pathway into private dental practice could not be my pathway! I wanted to immerse myself more deeply in dental medicine, to learn as much as I could from competent colleagues, and to experience more contemporary (not to say «radical») dental treatment concepts. Mühli's department seemed to me to be the right place at the right time. I applied for an assistantship in the Department for Prevention, Conservative Dentistry and Periodontology, and I was of course extremely happy when I received an offer to become a junior assistant (in the U.S.A.: «graduate student»).

### Rich years of learning as an assistant in Mühli's department

Later, during my many years as a co-worker in Mühli's department, I participated in hundreds of clinical patient case presentations, and observed Mühli as he performed surgery; I regularly attended his lectures and participated in the many seminars he organized. Through all of this, I was continuously amazed by his phenomenal knowledge and his didactic abilities. He was for me the embodiment of an academic teacher/mentor, whose conclusions were always based upon scientific data, and who could find crystal clear relationships within clinical procedures that had to be either accepted or rejected. There is one negative point that, looking back, I have to mention: For years he did not reconcile a major clinical/scientific controversy: The Scandinavian researchers believed that periodontitis was a microbial plaque-related disease, while other scientists supported a more mechanical, functional etiology involv-

ing improper occlusal loading. Mühlemann's depth of scientific knowledge lead him to accept the credibility of the plaque-based theory, but as a clinician he was vehement in his conclusion that patients suffering from periodontitis would benefit from the removal of occluso-articular improper loading («occlusal adjustment,» «premature contacts»). After visiting numerous Scandinavian dental clinics and universities, he summed up his observations like this: «Plaque control in the patients I have observed is optimal. But due to surgical procedures, their teeth are too long, and they wiggle like cows' tails.»

I fondly remember the discussions he had with patients, expressing empathy as he tried to extract responses from them, but rock solid in subsequent argumentation with his staff, trying to elucidate possible etiologic factors and apply them to a definitive diagnosis. I can still hear him saying: «More or less everything is covered in the literature. One just has to read books and journals, and properly interpret what is written.» Thus he was, our Mühli, for himself and with his enormous knowledge base: Almost everything was self-evident!

I also think fondly back to being present when Mühli performed surgery, always with the highest possible clinical skill and deftness. These events could be compared to theatrical presentations on the stage! The older staff members arranged themselves politely at the foot of the operatory chair, while the young members clustered and jockeyed for positions near the patient's head, near the surgical site. Wherever possible back then, tablets of blank paper were used to immediately capture any of the surgeon's deft maneuvers or Mühli's cryptic comments in writing. During the post-surgical staff meeting, some were intrepid enough to suggest that the operation had not gone precisely as portrayed in the text book. Mühli usually dismissed such comments with a wave of his hand, and guaranteed that the surgical result would turn out to be excellent. And to our surprise, he was (almost!) always right! He was so self-assured because of his vast knowledge and his innate and well-honed clinical skills.

### Oral immunology – Immune responses in the etiology of periodontitis: Mühli transfers me to Thomas Lehner in London

One day, Mühli stormed into my office with a stack of publications from his private collection. «Tonight I read» – reading at night was one of him most treasured pursuits – «that bacterial invasion into tissue appears not to be the primary cause of periodontitis, but rather the subsequent immune response mechanisms. We have to learn more about that! Are you knowledgeable in this arena?» No, I was not. Up until then, we were operating under the assumption that periodontal destruction could be attributed to the bacteria, and that even specific bacteria were the etiologic agents. «Then we

have to undertake something. I am assuming that, in the future, we are going to have to deal intensively with the local immune mechanisms. Would you take on this responsibility?» Without waiting for my answer, he turned around and left my office. A half hour later, he was standing in my office with a broad smile on his face. «I just spoke with Thomas Lehner in London on the phone. You know him from the literature. He would be in a position to integrate you into his research team for a year, and to teach you the theoretical and practical fundamentals of oral immunology. This is truly an offer you can't refuse!» I almost fell off of my chair! First of all, Thomas Lehrer was the European authority in the discipline of oral immunology, and it would therefore be, for me, a once-in-a-lifetime chance to study and work with him. Secondly, I immediately realized the content of Mühli's last remark: The arrangement as well as my transfer to London had already be codified! Only the dates had to be decided upon. It is with deepest gratitude that, later in my academic career, I am thankful to Mühli for this «deal,» that was so typical of him. In Thomas Lehner's department, I learned a great deal about oral immunology. I also learned about the key role of the immunologic response in the etiology of periodontitis, and I had the opportunity to participate in scientific investigations to further our knowledge of this dental medical discipline.

### Enough of the carefree life as a fledgling academic – Hard times as Mühli's lectoral assistant

It was always Mühli's habit to put his co-workers into various categories. For these decisions, he utilized many observational criteria. In the category of «work time,» he liked to differentiate between «soft» and «hard» workers. The «soft» ones held to a firm «8 a.m until 6 p.m.» work schedule, while the «hard» ones arrived at work at the latest at 7 a.m. and left no earlier than 7 p.m. At that time, with Mühli busting his collar, I belonged to the «soft» group, for whom the usual «8 'til 6» regimen was already too intensive. I was the ceremonial «old-timer» of a student organization (U.S.A.: fraternity) in which it was quite normal to hang around the bars a few times per week, usually into the wee hours of the morning. One day – I arrived at work too late and met Mühli as he conducted his usual morning rounds in the departmental clinics – and he confronted me, telling me that starting tomorrow I would be his lectoral assistant, with all of the consequences and responsibilities thereunto pertaining. And the consequences were considerable! Mühli's predilection for the early morning hours was well known to me, but I did not yet know concretely what the «honorary» title of «lectoral assistant» meant. He demanded that his slides be ready an hour before the scheduled lecture so that he could discuss the lecture with me and the organization of the slides, which I had to gather from his "diatek" on the same day. I also knew that his lectures always began precisely at 8:15 a.m.; he made sure I knew that! I quickly figured out what that meant for me, and I saw only black before my eyes! Slides ready an hour before the 8:15 a.m. lecture, so that meant by 7:15 a.m. Selection and arranging the slides would take half an hour, so that meant 6:45 a.m. Getting up in the morning and driving to the Institute took ¾ of an hour = 6 a.m.! Inhuman! Impossible! I gently asked if maybe the slides could be selected, discussed and arranged the day before the lecture. «No,» was the only response I received. My counter-arguments were absolutely useless. They were given short schriff by Mühli: «You are here to learn, not to sleep.» And he also made it clear to me that he would not always be able to attend the undergraduate student clinic, and that I would be expected to give him a report at the end of each day (after working hours) concerning events that had occurred in the student clinics that day. He would consider additional duties, and said he would let me know later about them. I realized that the "good life" as a graduate student had come to an end, and that it was time for me to learn to accept responsibility, not only to my patients but also to my faculty obligations. I stood at the door-

*Prof. em. Dr. med. dent Heinz H. Renggli*

1963 – 1968	Assistant with Mühlemann/Conservative Dentistry, Zurich
1969 – 1972	«Oberassistent» with Mühlemann/Periodontology
1973	Director, Conservative Dentistry, University of Basel
1974	Advanced education in microbiology/immunology, Guy's Hospital, London
1976 – 2001	Professor, University of Nijmegen, NL Chairman, Department of Periodontology
2001	Retired (emeritus professor)

step of departing the «soft» group of co-workers, and entering the «hard» group who really invest their all in their work. For all of this, I am grateful to Mühli, and for all of the time I spent on his team in Zurich, learning and experiencing so many things that would stand me in such good stead later in my life in academia.

### The call to Nijmegen

After many educational years with Mühli, in 1976 it came time for me to bid farewell to Mühli's department, and to use and share all that I had learned and experienced, in a new country and in a new academic position. I was offered the opportunity to create a new Department of Periodontology at the dental school in Nijmegen, the Netherlands, and to share with my staff the teaching of contemporary dental medicine to dental students, and to offer continuing education courses to practicing dentists, courses that reflected Mühli's devotion to prevention and also treatment of periodontal diseases. My departure was made more deeply meaningful at a party organized in my honor in the department, where Mühli

had such kind words to say about my contributions over the years. Finally, the last days of my Zurich years came and went. I had to say my personal and very heartfelt good-bye to my honored and respected teacher, to my mentor, my life's example and my years-long Chef. My departure was short, intense, and very emotional. «Heinz, do a good job. Show it to those Dutch.» I knew exactly what Mühli meant! I promised him that I would give it my best shot.

#### Contact

*Prof. Dr. med. dent. Heinz H. Renggli*  
*Prof. emeritus in Periodontology*  
*(Radboud UMC, Nijmegen, NL)*  
*Dr. med. dent. (University of Zurich)*  
*Droogstraat 2*  
*NL-6581 KH MALDEN*  
*The Netherlands*  
*hhrenggli@hotmail.com*

## INTENSIVMEDIZIN 1976–1989

# Gespräche und Beiträge in SWISS MED

### Die Jahre der Etablierung der Intensivmedizin in der Schweiz

#### SWISS MED 2/11 (140 S.)

**Die Schweizerische Gesellschaft für Intensivmedizin (SGI) wurde am 4. Februar 1972 in Basel gegründet. Diese Gründung war das Werk der «Pioniere» der Intensivmedizin in der Schweiz.**

In den Jahren 1976 bis 1989 erfolgte die Etablierung der Intensivmedizin in der Schweiz, was SWISS MED, gegründet 1979, mit Live-Interviews und tragenden Beiträgen begleiten durfte und was in der hier angekündigten Ausgabe SWISS MED 2/11 dokumentiert wird. Diese Ausgabe wird auch aufgelegt, weil sie vermutlich gute Dienste leisten wird, wenn die Schweizerische Gesellschaft für Intensivmedizin (SGI) 2012 auf 40 Jahre ihres Bestehens zurückblicken wird.

#### Editorial

PD Dr. med. Peter Carl Baumann

– Bis August 2000 Leitender Arzt der Med. Intensivstation, Universitätsspital Zürich

– 1975–1979 Sekretär und 1979–1981 Präsident der SGI

#### Dank

Der Verlag dankt den nachstehend aufgeführten ehemaligen Präsidenten der SGI für ihre wohlwollende Unterstützung der Ausgabe SWISS MED 2/11:

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SWISS DENT 2/2018 – Special issue in remembrance of the 100<sup>th</sup> birthday of Hans R. Mühlemann (\*August 26, 1917 – †June 1, 1997)

# Hans R. Mühlemann – Pioneer in the Research of the Oral Diseases Caries and Periodontitis

## Two Companions – Herbert F. Wolf and Ulrich P. Saxer – Report their Memories of their Great Teacher and Mentor

Interview: Dr. Felix Wüst

Discussion with Dr. med. dent. Herbert F. Wolf., Adliswil, and Prof. Dr. med. dent. Ulrich P. Saxer, Forch, Switzerland

*In its August 2017 edition, SWISS DENT published for its readers all of the articles written for SWISS DENT by Professor Hans R. Mühlemann since this journal's inception in 1980, through 1985. This omnibus presented the multi-layered realm of ideas and initiatives that Mühlemann spawned in support of his lifelong goal: «More oral health for more people.» Soon after this 1/2017 retrospective publication, three old friends got together for an intimate «editorial conference.» Those were Professor Thomas Imfeld, Professor Ulrich Saxer, and yours truly. An additional former co-worker of Mühlemann, Professor Klaus König from the Netherlands, agreed to be an external consultant to the project team. The discussion centered around how best to present the life and work of Hans Mühlemann, as well as to portray his radiant and infectious personality. We decided upon a special edition of SWISS DENT comprised of original ar-*

*ticles written by Mühlemann's former colleagues and co-workers, under the encompassing title of «Companions remember.» From the vast number of his former colleagues around the world, several were asked to contribute original articles. We were delighted that virtually all who were asked responded enthusiastically in the affirmative. Two former colleagues were invited for an interview with the Editor-in-Chief of SWISS DENT: Dr. med. dent. Herbert Wolf and Professor Ulrich P. Saxer. Wolf was Mühlemann's «photographer» since the early 60s, and is co-author of dental textbooks and color atlases that have been distributed in the millions worldwide. Saxer was a pioneer in the profession of dental hygiene. Both Wolf and Saxer attribute their professional accomplishments to the impetus provided them by Hans Mühlemann.*

*Dr. Wolf, Professor Saxer, you have graciously accepted my invitation to this interview, for which I am eternally grateful. Our hosts here in Adliswil are Mrs. Maya and Dr. Herbert Wolf. Thank you very much for your hospitality. The subject of our discussion today is Professor Hans Mühlemann, a true pioneer in dental medicine, whose 100th birthday will be celebrated on 26 August 2017 at a symposium organized by the Center for Dental Medicine of the University of Zurich. I have invited you to this interview because I am aware that you lived in Mühlemann's atmosphere for many years, and thus can provide for our readers particularly interesting insights into Mühlemann's lifework, and beyond that even into his personality and stature.*

HERBERT F. WOLF: We are more than happy to participate in this interview because we wish to perpetuate worldwide knowledge of Mühlemann's enormous contributions to dental medicine. Mühlemann – we always called him «Mühli» – was without doubt one of the most gifted dentists in Europe during the second half of the 20<sup>th</sup> Century.

SAXER: Yes, both of us had the good fortune to know and experience Hans Mühlemann over the course of many years. As is true for many others of his colleagues and co-workers, we are indebted to him for so much, in terms of our professions, and almost everything else! Dr. Wüst, you also got valuable contri-



7 June 2017 in Adliswil, Switzerland: Dr. med. dent. Herbert F. Wolf (middle) and Prof. Dr. med. dent. Ulrich P. Saxer (right) in an interview with Dr. Felix Wüst, Editor-in-Chief of SWISS DENT (photo: Maya Wolf)

butions from «Mühli» when you were introducing your journal SWISS DENT.

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*That's true. In October of 1979 I phoned Dr. Mühlemann and informed him that I wanted to send the first edition of SWISS DENT to all dentists in Switzerland in January 1980. I was completely overjoyed by his massive level of input as the first editions of SWISS DENT came together. In the very first edition, we published an exhaustive interview with him on the topic «Dental Medicine – Its Future.» The contents of this interview became the on-going «program» for SWISS DENT. But let's get down to it! Dr. Wolf, when did you first get to know Mühlemann?*

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HERBERT F. WOLF: I can't say for certain. Prof. Mühlemann had his office in the old Dental Institute at Zürichbergstrasse 4. Students in the first two pre-clinical years – of which I was a member in 1957/1958 – were taught primarily by associate staff; we only saw Mühlemann in the lecture hall.

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*What was the main doctrine of dentistry back then?*

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HERBERT F. WOLF: We were for the most part trained in «reparative» dentistry. But even back then, Mühlemann was introducing the concept of preventive dentistry into the curriculum. In private dental offices, patients received the earliest pamphlets describing what to do in the case of this or that disease. Even then, proper tooth brushing was illustrated and recommended, especially cleansing of the interdental spaces.

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*Dr. Saxer, how did you first meet Mühlemann?*

ULRICH P. SAXER: As a child, I first met Mühlemann in my home. Together with Mühlemann, my father was involved in the leadership group of the Zurich Dental Society. At least twice a year, the officers of that organization held a meeting at our house. My father told me a lot about this «just-returned-from-America» Professor Mühlemann! This experience gave me a formerly unheard of view into the future of dental medicine in Switzerland. This «Mühli» would likely be a tipping point for dentistry in our country and in Europe. So, this man came back from America and announced that prevention and prophylaxis were the alpha and omega of dental health.

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*How did the dentists in Switzerland react to this?*

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ULRICH P. SAXER: Prophylaxis and adjunct personnel to carry it out were completely unknown to many dentists. The Public Health Department of the Canton of Zurich, as well as a goodly portion of the members of the Zurich Dental Society were not impressed. The first dental hygienists in Switzerland were American, Canadian, or citizens of other countries, who had practiced their profession for decades. At this moment in time, Swiss dentists adhered to the motto «your job stops at the lip line,» when it came to duties performed by auxiliary personnel. Now dentists were confronted by auxiliary personnel who could perform tooth cleaning procedures, including scaling, in addition to patient motivation and instruction in oral hygiene, which were not viewed as «operative» procedures. Mühlemann advocated in the early 60s that the incidence of dental caries in Switzerland could never be effectively combated by purely therapeutic measures.

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HERBERT F. WOLF: Finally the government set up regulations whereby foreign dental hygienists could receive a work permit for one or two years. In 1961, the Swiss Dental Society (SSO) «tolerated» a



Zürichbergstrasse 4



Zürichbergstrasse 8



The old Dental Institute was housed in two buildings at 4 and 8 Zürichbergstrasse. The offices of Professor Mühlemann, Thomas Marthaler and Klaus König were in building 4, and the dental clinics in building 8. The new Dental Institute at Plattenstrasse 11 (photo) was first occupied in the early 1960s. «Mühli's» office is marked with an orange dot.

program to establish whether or not dental hygienists would be allowed to practice in the country.

*How did it happen that the first dental hygienists came specifically from North America?*

HERBERT F. WOLF: The profession of dental hygiene was founded in America in 1913. Primary players in this regard were a U.S.-American dentist named Alfred Civialon Fones (\*1869, †1938) and his assistant and cousin Irene M. Newman, whom he trained and educated as the first dental hygienist in the world. In Switzerland, Zurich took the lead in all matters relating to dental hygiene and dental hygienists (DH). Young Swiss dentists who had the opportunity to spend time in the U.S.A. became aware of the profession of dental hygiene and what it could add to a dental practice environment. A Zurich dentist and good friend of Mühlemann, Dr. Raoul Boitel, hired a dental hygienist despite strong opposition and without any Swiss licensure. He was even threatened with expulsion from the Swiss Dental Society (SSO)! Hans Mühlemann faced the same destiny.

*How did the other dental schools in Switzerland react to these activities in Zurich?*

ULRICH P. SAXER: Those of us in Zurich were viewed with suspicion for a good ten years. Confrontations occurred not so much in the universities as from the professional organizations such as the SSO. All efforts by Raoul Boitel and Hans Mühlemann to further the cause of individual prophylaxis with participation by dental hygienists were torpedoed. It was not until 1967 that the SSO agreed to participate in the new DH project. In 1975, we could report a 50% reduction in dental caries incidence in Swiss school children!

*With regard to caries reduction, was it not possible that the WWII years also played a role somehow? The diet was not so abundant then; there were fewer sweets?*

HERBERT F. WOLF: True. During the WWII years, one observed a significant reduction of dental caries. Many believed that this could be attributed to sugar rationing. This knowledge emanated from the research work of dentist and physician Adolf Roos, who studied caries in the city of Goms. In 1911, the Furka railway was completed, and with it the free transfer of refined nutrition products, especially fine flour and sugar products, which supplanted the former whole grain products. Dr. Roos published his findings in his book «Culture Decline and Dental Destruction.» This book was published in 1962 by Hans Huber Publishers, Bern. As soon as the war was over, dental caries incidence and severity increased rapidly.

*Dr. Saxer, who came up with the idea of establishing a school for the education and training Swiss of dental hygienists?*

ULRICH P. SAXER: Because of the favorable experiences with American dental hygienists, the SSO decided to recognize the profession of dental hygiene, at its meeting in Zurich in 1966. At the end, it was visionary practitioners like Raoul Boitel, his colleagues, and Hans Mühlemann – the esteemed professor – who pushed the «dental hygiene question» to its final conclusion. Among the young dentists who had already experienced collaboration with dental hygienists during their university studies, a group under the leadership of Max Leu appeared, and this group finally, in 1973, celebrated the official governmental «blessing» and financial guarantee for the establishment of a dental hygiene school in 1975. Swiss dental hygienists could practice the «new dental profession»!

König and Marthaler were Mühlemann's first assistants and researchers. He always stood behind them as their great inspirer and motivator.

HERBERT F. WOLF: Yes. Mühlemann was a font of ideas, and he gave his co-workers a lot of freedom and support. If they needed anything – apparatus, instruments – he made it available, usually from

his own extramural financial sources. Today, we have fluoridated salt. The effectiveness of fluoridated salt against dental caries was demonstrated by the research studies of Thomas Marthaler in «Mühli's» department. Marthaler is also the father of the Swiss school program whereby children brush their teeth once or twice daily in specially constructed dental hygiene areas within the classrooms. Klaus König and Thomas Marthaler essentially created a new profession: the «School Dental Tooth Cleaning Instructor.» In large groups, school children were taught correct techniques for tooth brushing. Furthermore, the children's mothers as well as the teachers were given information about nutrition.

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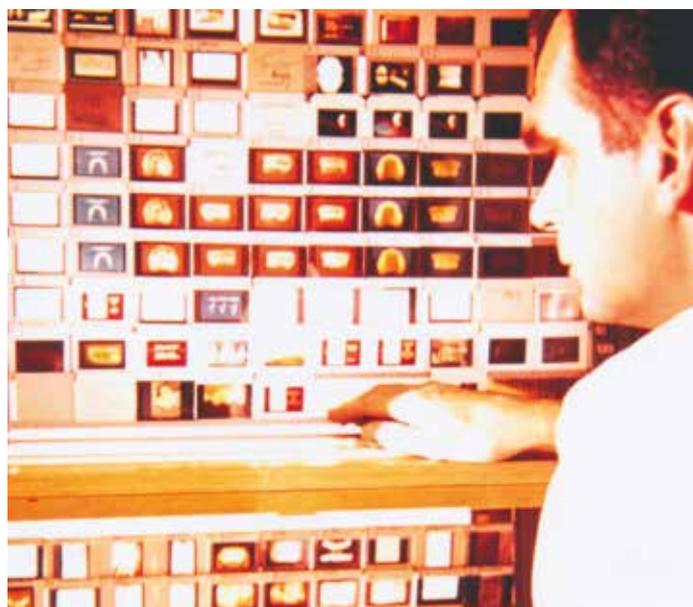
*We touched briefly on the subject of sugar, which was a major subject of interest for Mühlemann. Can you provide more information about this?*

ULRICH P. SAXER: Mühlemann recognized early on that sugar could be detrimental not only to teeth, but could also exert negative systemic effects: Diabetes and obesity are included in this arena. Using his rat animal model, he demonstrated the systemic effects of eating bread with butter or bread with sugar-containing spreads. Using this model system, it became possible to evaluate almost all food sources. In the years 1965 through 1967, using special rat experiments, König was able to show that sugar was the primary substance responsible for dental caries. We also learned that only specific biofilm bacteria are responsible for caries. It is in this arena that Prof. Bernhard Guggenheim achieved his prominence as a dental researcher; he was on the «Mühli»-Team since 1962.

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*Dr. Wolf, we would be very interested to hear about how you came to your own life's work, the creation of the now widely acknowledged color atlases of dentistry, which have provided continuing education for dentists worldwide.*

HERBERT F. WOLF: It was in about 1961, when we were sitting in the lunch room, where we regularly gathered on Mondays. Klaus Rateitschak was sitting at the vast departmental «diaték,» sorting slides for his lecture. The diaték was back-lighted and open. Mühlemann walked back into the room, looked at the slides, and murmured «It would be really great if we had a book with large color photographs of healthy, pink gingiva and erythematous, swollen gingiva, and also clinical treatment portrayed and described step-by-



Klaus Rateitschak preparing his lecture, seated at «Mühli's» «diaték» (1961)

step, as well as «before» and «after» photos. Klaus Rateitschak and I were speechless, and we immediately took it upon ourselves to fulfill «Mühli's» challenge: We would produce such a book!

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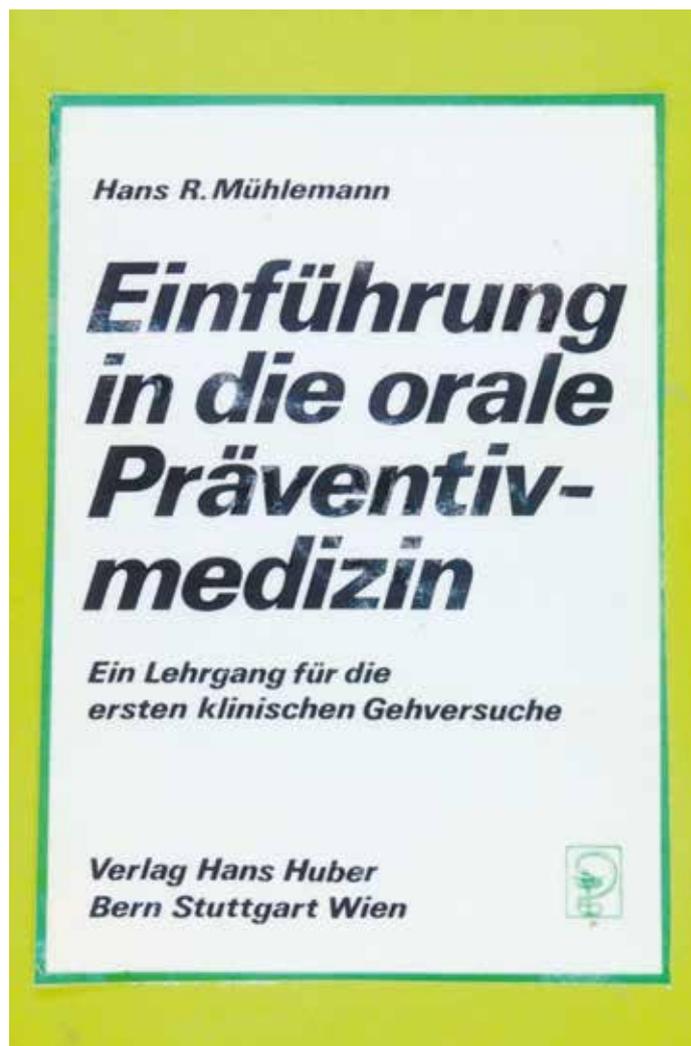
*When did you finally fulfill this dream?*

HERBERT F. WOLF: The desired, sought for, first Color Atlas of Periodontology appeared much too late, at the end of 1984, 23 years later! At that moment, «Mühli» had been a successful researcher for 30 years, by then retired.

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*Why the generations long wait?*

HERBERT F. WOLF: Our primary target was always the Color Atlas of Periodontology project. However, following the St. Moritz courses of 1964 – 1967, there were numerous other items on the «to-do» list: In 1974, Mühlemann's new book «Introduction to Oral Preventive Medicine» was released by Hans Huber Publishers, Bern. In 1975, the paperback book «Periodontology» authored by Mühlemann, Rateitschak and Renggli was published by Thieme Publishers, Stuttgart, and at the end of 1976 the first edition of the highly-acclaimed «SSO Atlas.» Subsequent editions of this book were published as «Dental Atlas,» reproduced in five languages. These all contributed to the delay in creating the first Color Atlas of Periodontology, in 1984.



This monograph was published in 1984 by Hans Huber Publishers (Bern). The book was later translated into English by Professor Thomas Hassell (Quintessence Publishers, Berlin).



The first edition of the paperback textbook «Periodontology» was published in 1975 by Georg Thieme Publishers, Stuttgart. A second and a third edition followed in later years.



The first edition of the SSO Atlas appeared in 1976. In subsequent editions it was called a Dental Atlas, and was published in five languages.



The authors of the SSO Atlas: Markus Ebnetter (left), Herbert F. Wolf (middle) and Andreas Wolgensinger (right).

It was in 1977 that Rateitschak reminded me of our promise to Mühli. He asked me to accompany him to Stuttgart, Germany, to visit Thieme Publishers, which had printed the second edition of «Handbook of Periodontology.» He promised to introduce me as «the successful author of the SSO Atlas.» The chief dentist at Thieme, Dr. Dieter Breckamp, expressed very little enthusiasm for a color-enhanced paperback edition of Rateitschak's Handbook of Periodontology, so we countered with a proposal for a large-format periodontology atlas with color photography, similar to the SSO Atlas. Then, Breckamp asked about our conditions. Our response was bold, maybe even a bit audacious: We wanted to create a really big book (we had «Mühli's» thoughts in mind), and we wanted it to be published simultaneously in German and in English. In short, the Color Atlas of Periodontology was a tremendous success. Rateitschak recruited Prof. Thomas Hassell as a contributing co-author and translator for the English edition. The Second Revised and Expanded Edition (1990) proved to be the best seller, with four printings. Needless to say, the publisher, Thieme Publishers, Stuttgart, was very impressed, and asked us to consider creating a «Color Atlas» series for all of the dental specialties. Thus began the series of 16 books emanating from Thieme, with many different authors. It was, sadly, only after the death of our friend «Pascha» Rateitschak that the Third Edition of «Color Atlas of Periodontology» was published in 2004, in 12 languages.

Now let's leave the world of book and atlas publishing, and get back to a discussion of the three decades of Mühlemann's scientific contributions.

**Prof. Dr. med. dent. Ulrich P. Saxer**

- 1961 – 1967 *Dental student, University of Zurich; graduation April 1967*
- 1967 – 1967 *Private dental practice, Zurich*
- 1967 – 1972 *Faculty member, Dental Institute, University of Zurich, under Prof. Hans R. Mühlemann*
- 1969 *Received the degree Dr. med. dent (University of Zurich)*
- 1972 – 1973 *Assistant Professor, University of Michigan (Occlusion; Prof. M. Ash)*
- 1973 – 1984 *Oberassistent (Engl. Associate Professor), under Prof. H.R. Mühlemann*
- 1973 – 1993 *Director, Dental Hygiene School, Zurich*
- 1980 *Habilitation (Engl. Promoted to professor), Periodontology and Preventive Dental Medicine (University of Zurich)*
- 1994 *Sabbatical, University of Pennsylvania, Philadelphia, U.S.A.; Oral Prevention, under Prof. S. Yankell*
- 1994 – 2013 *Director, Prophylaxis Center Zurich Nord, with private dental hygiene school*
- 2000 – 2004 *President, Swiss Society for Periodontology (SGP)*



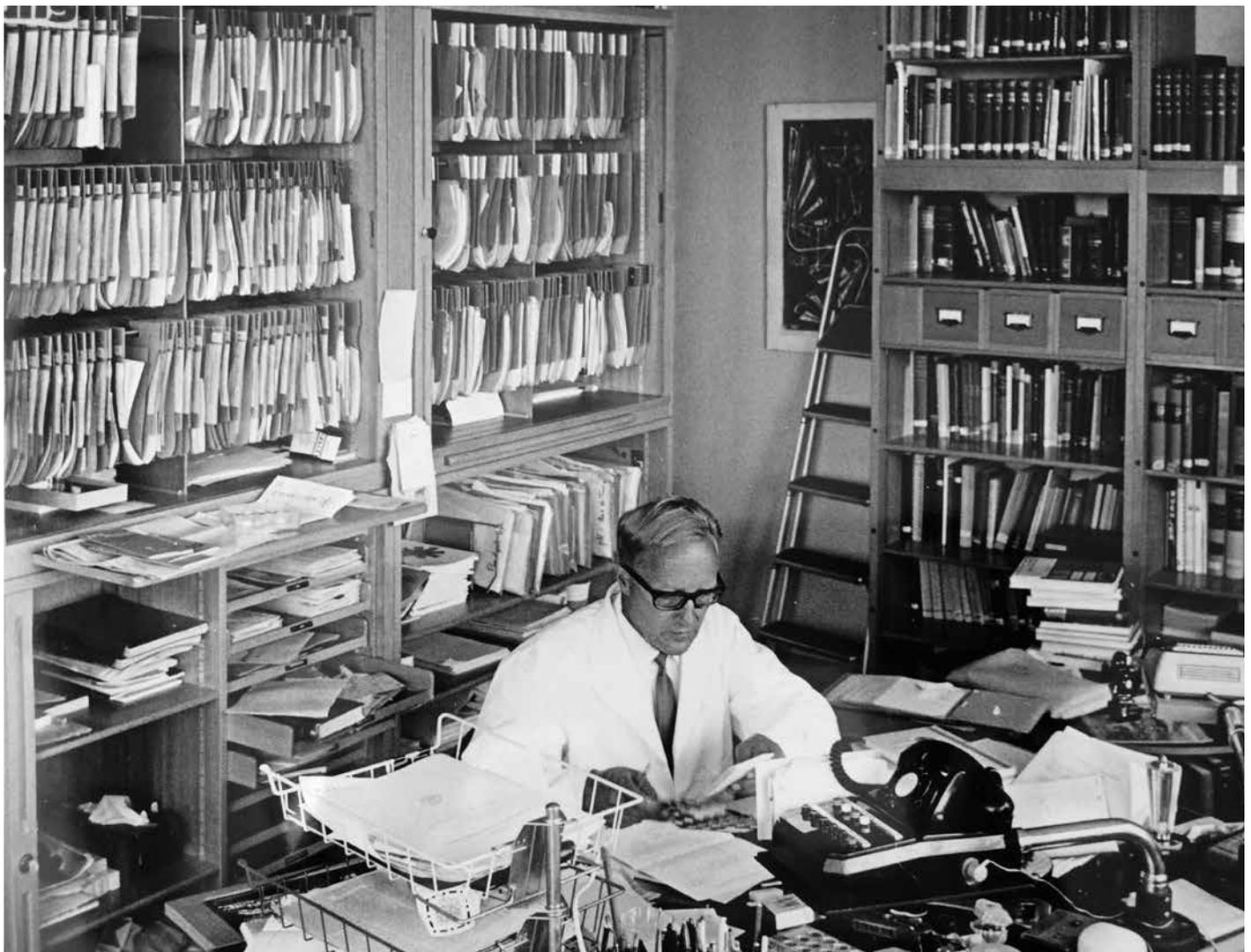
Sixteen Color Atlases of Dental Medicine, from Georg Thieme Publishers (Editor: K. H. Rateitschak; starting in 1990 Co-Editor H. F. Wolf)

ULRICH P. SAXER: In the 1950s, chosen as chairman in restorative dentistry, Mühlemann entered into a dark time for dentistry. If a dentist placed a restoration back then, a year later the patient would return with two new cavities, and the margin of the restoration would exhibit new caries. This situation was manifested by many military recruits in 1970. In addition, the gingival tissues exhibited an almost desolate condition.



Remarkable clinical photograph taken during dental examinations of military recruits in Zurich. This illustration depicts the oral condition of a 20-year-old in the Zurich recruitment center in 1970 (Photo: Dr. M. Germann; 04.08.1970).

For Mühlemann, this made no sense. Instead of «repairing» teeth, he advocated research into the etiology of oral diseases, and how a healthy status quo could be achieved. This new course was adopted by his colleagues, and supported by his own office in which more than 300 hanging folders contained reprints of scientific research published in professional journals from all over the world. If one went to him with a problem, Mühlemann would give a file number where the questioner could find all relevant information. In those times, there were no computers for data storage and quick access to information. In the early years, Mühlemann dedicated himself to the establishment of the caries research laboratory and development of epidemiology for caries and periodontitis. He chose Klaus König to lead efforts in caries research, and asked Thomas Marthaler to handle all aspects of statistical data analysis. His personal engagement was targeted toward caries prevention by means of fluoride-containing dentifrice, salt fluoridation and water fluoridation. In the second decade of his leadership, Mühlemann sought to disseminate new scientific knowledge not only to his university colleagues but also to practicing dentists throughout the country, by means of continuing education (CE) courses and symposia. Following the immortal words of Goethe – «Man sees only that which he knows» – Mühlemann strove to share his knowledge with members of his chosen profession. Even earlier than the 1960s and throughout the 1970s, through his teaching and in his clinical practice, Mühli pursued the «periodontitis question» with dentists in Switzerland, Austria and Germany by presenting CE courses in



«Mühli» in his element, surrounded by bookcases and more than 300 hanging files containing his collection of scientific literature from professional journals and other sources. If somebody wanted to learn something from «Mühli», he received a file number and could seek the information he wanted!

St. Moritz and in his student lectures in the university. He was supported in these efforts by his Chief of Clinics Klaus Rateitschak and later by Hubert E. Schroeder and Heinz Renggli. Mühlemann found additional support from within his large circle of personal and professional colleagues, including Dr. Alfred Egli, Prof. Ruedi Hotz and Dr. Raoul Boitel. Also during these decades, «Mühli» significantly enhanced dental education reforms, which were fully implemented in 1969. One special reform was the inclusion of periodontology as a topic for the national board examination.

*And how did the professional dental organizations react to such sweeping changes? Were there already professional societies in the discipline of periodontology at that time?*

ULRICH P. SAXER: Yes, we had the ARPA (Arbeitsgemeinschaft für Parodontose-Forschung), founded in 1924 by Oskar Weski, Hans Sachs and Robert Neuman. Then in 1932 ARPA International was created, incorporating groups in Germany, France, Italy, Switzerland, Czechoslovakia and Finland. Also there were local perio study clubs in Switzerland, Germany and other European countries. At the last ARPA International conference in Basel in September 1969, Mühlemann first declared that all evidence indicated that «periodontosis» was truly an inflammatory disease, thus «periodontitis.» Secondly, he stated his opinion that ARPA dentists would concentrate on scholarly conventions and festivities. As a result of this, in January, 1971, the Swiss arm of ARPA International was dissolved, and Mühlemann founded the Swiss Society for Perio-

dentology (SGP), and was its first president. At the end of 1971, ARPA International itself was dissolved. The first annual meeting of the SGP was held in Olten (CH) in November 1971. At this meeting, the findings from the first mass oral examinations of military recruits in Zurich were presented, especially the data concerning the recruits' periodontal status. Administratively, guidelines were established for the education and licensing of specialists in periodontology. This included a minimum 4-year post-D.D.S. program, and the first president, Dr. Klaus Rateitschak, decreed that certification would demand the presentation of clinically documented cases completed by the applicant. In addition, applicants were required to have published at least two papers in reputable scientific/clinical professional journals. The first Swiss periodontologists were certified in 1972/1973. Using a «grandfather» clause, Mühlemann's former co-workers in clinical periodontology were certified as «specialists.»

*How did the other Swiss university dental schools react to this?*

ULRICH P. SAXER: Thanks to Mühlemann's support and the newly instituted guidelines for periodontal education/training, professorships in periodontology were established in Basel (Rateitschak, 1968), Geneva (1971) and Bern (1972). The periodontology department in Geneva went to Prof. Giorgio Cimasoni, and that in Bern to Mühlemann's former student Prof. Hans Graf.

*It was in 1966 that foreign dental hygienists received governmental approval to practice in Switzerland. One year later, in 1967, the Swiss Dental Society (SSO) at its meeting in Baden (CH) approved the establishment of a training and education program for dental hygienists in Switzerland. The proposal was approved in Zurich in 1972, and the school opened in 1973. Dr. Saxer, what role did you play in this new development?*

ULRICH P. SAXER: At that time, the plan was to identify space in the University of Zurich Dental Institute for the education of 20 students per year in a 2-year DH program. Mühlemann asked all of his department co-workers if they would be interested in taking a leadership role in the new DH school. Apparently, nobody stepped forward, and one day «Mühli» asked me if I might be interested.

*So now the project called «Zurich Dental Hygiene School» was concretized?*

ULRICH P. SAXER: Before I took off for my 1-year sabbatical program at the University of Michigan (Ann Arbor, MI, U.S.A.), I had the opportunity to visit dental hygiene schools in Sweden, England and the Netherlands. In August 1972, I went to Ann Arbor to study with Prof. Major Ash in his department. Concurrently, I was able to experience the Masters Degree program in periodontology, headed by Prof. Sigurd P. Ramfjord.

*And at some time during this period, you received the news that the DH school in Zurich was ready to start, and you should pack your bags and come back to Switzerland. Correct?*

ULRICH P. SAXER: Yes, that's how it occurred. In the autumn of 1972, the decision to start up the Zurich DH school was made, and I was asked to assume the directorship. I responded that I would only be interested in the job if Swiss DHs could be trained to perform subgingival instrumentation. I was given this guarantee, and began immediately to plan and institute the first Swiss DH education and training program. Mühlemann offered me a half-time position on his clinical staff. By the end of September, 1973, I was wrapping

**Dr. med. dent. Herbert F. Wolf**

- 1955 – 1960 Dental student, University of Zurich
- 1960 National Board Exam, University of Zurich
- 1964 Received degree Dr. med. dent, University of Zurich
- 1960 – 1966 Oberassistent (Engl. Associate Professor), under Prof. Hans Mühlemann, University of Zurich
- 1963 Military anesthetist, Zurich University Hospital, under Prof. Dr. med. G. Hossli
- 1960 – 1975 Clinical instructor, Dental Institute, University of Zurich, under Prof. H. R. Mühlemann
- 1968 – 1995 Instructor in Dental Medicine, University of Basel, under Prof. K. H. Rateitschak
- 1984 – 1989 Book author in the areas of periodontology, graphics, layout (German and English); Dental Color Atlas series, Georg Thieme Publishers, Stuttgart
- 1966 – 1986 First private dental practice, Zeltweg 63, Zurich
- 1972 Specialist degree in periodontology SSP/SSO
- 1976 – 1983 SSO / Dental Atlas, Lizenz Freier Verein Deutscher Zahnärzte (FVDZ) (Quintessence Publishers, Berlin)
- 1986 – 2012 Second private dental practice, Löwenstrasse 55, Zurich
- 2004 – 2014 Periodontology, Color Atlas of Dental Hygiene (3<sup>rd</sup> edition) 2012. Numerous book awards and honorary memberships
- 2012 Closure of private dental practice

up my sabbatical year in Michigan. In October of that year, 23 fresh-faced students showed up in the new DH school at Minervastrasse 99 in Zurich! The didactic and clinical instructions traversed by these students were in combination with the dental education programs in preventive dental medicine and periodontology in the University of Zurich Dental Institute. In the beginning, «Mühli» was a member of the DH Oversight Board, and this was very important for the initial development and implementation of the new program. For the first two years, we ran the school with a very small team, which included a part-time secretary, two DH clinical instructors, Ms. Gunda Brakus from Lettland, U.S.A., and Ms. Barbro Jern, a dental hygienist from Prof. Jan Lindhe's clinical team in Gothenburg, Sweden.

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*When were you able to graduate the first real Swiss dental hygienists?*

ULRICH P. SAXER: That was in the autumn of 1975. Three years later, the possibility of educating and training DHs in the University of Zurich was severely cut back, mainly because of space limitations. The authorities decided to support the creation of 19 clinical DH operatories in the new school. As a result, 25 new students could be accepted per year. In 1984, 25 students entered in the spring and 25 in the autumn, and the clinic was expanded to 32 operatories. All of this happened because of Mühlemann's support! Coordinating 100 students, about 40 DH instructors, many of them part-time, and some 30 external teachers was obviously too much for a half-time director, and I was given a full time director position.

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*What duties were you assigned by Mühlemann during the time period 1973 – 1983?*

Ulrich P. Saxer: As early as 1958, Mühli had undertaken epidemiologic studies of the gingival/periodontal conditions in Swiss citizens, working with Zalman Mazor. Together with Zvonimir Curilovic, Heinz Renggli and Max Schmid, in the summer of 1970 we examined over 500 military recruits in Zurich. In 1974, we examined 1,084 recruits in the city of Thun. In 1972 and in 1974, we published these data on military recruits, and presented the data at professional conferences in Switzerland and in other countries. Dental health had improved, but the quality of the restorative therapy was a catastrophe! We found that 87% of all restorations were either inadequate or poor. These extremely negative findings were not well received. Only a generation later could we report a significant improvement in the quality of dental restorations.

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*Herbert F. Wolf: What kinds of restorations were they?*

ULRICH P. SAXER: Of course most of the restorations were silver amalgam. Since that time, a tremendous amount of time and research has been invested in the so-called «white fillings.» Central in these developments were «Mühli's» co-workers Felix Lutz, Werner Mörmann, Jean-Francois Roulet.

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*A question concerning Mühlemann's final decade, 1973 – 1983: How were things and how did it go during Mühlemann's last decade in the University of Zurich Dental Institute?*

ULRICH P. SAXER: During his final decade of work, «Mühli» dedicated himself primarily to oral prevention and especially the public dissemination of this knowledge. In addition to his book «Introduction to Oral Preventive Medicine» (Hans Huber Publishers, Bern, 1974, in German; Quintessence Publishers, Berlin, 1976, in English), he gave innumerable lectures, published widely and broadly in the

professional literature, gave public presentations, provided articles for magazines and newspapers, as well as making scientific productions for Swiss National television. «Mühli's» exhibition «Healthy Smile – Joyful Mouth» was posted on busses and in trams and trains throughout Switzerland for eight years, and was set up in shopping centers and department stores. This greatly elevated the public's awareness of the necessity for and the benefits of good oral hygiene and health, and taught people the value of prevention for maintenance of healthy teeth for a life time.

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*What did Mühlemann hope to achieve with such an extended public display?*

ULRICH P. SAXER: He wanted to orient the public with regard to the significance of oral health. Every person must learn that good oral health is an achievable goal, and that caries and periodontitis are not simply «God given.» But he also wanted most of all that the entire dental team – the dentist, the dental hygienist and the dental assistants – would make patient instruction and information top priorities. Mühli attributed enormous significance to patient motivation. Together with his co-workers, he developed various tests of oral health, for example the Papilla Bleeding Index (PBI). Bleeding means disease; no bleeding means health!

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*Did Mühlemann have any preconceived notions about how to convince the public of the importance of his concepts of oral health and oral disease?*

ULRICH P. SAXER: He wanted to achieve his goal by bringing together all of the stakeholders. He often spoke of the responsibility «triangle»: The dentist (or the dental team as a whole), the patient, and the payer for services (private insurance, government subsidy, or the patient himself). To achieve this goal, he created a questionnaire: «Patient – Information – Confirmation.»

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*What did Mühlemann do primarily during the last few years, from 1982 and 1983?*

ULRICH P. SAXER: In those last years, he invested considerable time and interest in new restorative techniques. Together with Felix Lutz, Heinz Ochsenbein and Bernhard Lüscher, he worked tirelessly with composite restorative materials. Resulting from these endeavors was the Cerec technology by Werner H. Mörmann and Marco Brandestini.

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*What represented the cessation of Mühlemann's life work as a teacher and a researcher?*

WOLF: To close the book on «Mühli's» now-legendary career, in 1983 Professor Bernhard Guggenheim organized a large international congress under the title «Cariology Today,» sponsored and supported by the European Research Group of Oral biology (ERGOB). Many topics were included, such as epidemiology, saliva, nutrition, plaque, fluoride, prevention and therapy. The many lectures clearly demonstrated just how much «Mühli» had contributed to the arena of oral prevention, and the impulse he elicited in oral science. This congress was a loud recognition of and thanks to Hans Mühlemann. The proceedings of the congress were published in 1984 by Karger Publishers, Basel.

ULRICH P. SAXER: I like to think that «Mühli» departed a content man. The University had three of his former colleagues and co-workers from which to select his successor: Peter Hotz, Felix Lutz and Heinz Renggli. Mühli had significantly altered dentistry and dental med-

Wanderausstellung über moderne Mundhygiene zur Verhütung von Karies und Parodontitis

# Lachen gesund Freude am Mund

Dienstag, 19. bis  
Samstag, 30. Januar  
im Sarnen-Center,  
Sarnen

Wanderausstellung über moderne Mundhygiene zur Verhütung von Karies – Plaque – Zahnfleischbluten. Diese umfassende Information steht unter dem Schirmpatronat des Schweizerischen Gesundheitsamtes in Bern, und die fachliche Konzeption entwickelte das Zahnärztliche Institut der Universität Zürich und die Dentalhygiene-Schule Zürich.

In einem Ultra-Violett Tunnel können Sie den Plaquebelag fluoreszierend entdecken. Sollten Sie noch nicht genügend motiviert sein, die Zähne gründlich zu reinigen, können Sie den Plaquebelag mittels Plakoskop 500mal vergrößern lassen, und die Mikroben «bewundern», die ihre Zähne bis aufs Blut peinigern. Anwesende Dentalhygienikerinnen werden Ihnen aber zeigen wie Sie sich von diesen unerwünschten Bewohnern befreien können. Eine Ausstellung, die Sie mit Ihrer Familie ansehen sollten. Schulen gehören ebenfalls zu den vielen Besuchern dieser aufschlussreichen Wanderausstellung.



Mittwoch und Freitag  
Abendeinkauf bis 21Uhr

The travelling exhibition «Healthy smile – Joyful mouth» was displayed in department stores and shopping centers for eight years running, all over Switzerland.

**Traveling Exposition about Modern Oral Hygiene for the Prevention of Caries and Periodontitis**

## **HEALTHY SMILE – JOYFUL MOUTH**

(Translated by Prof. Dr. med. dent. Thomas Michael Hassell, B.S., D.D.S., Ph.D., C.B.A., High Point, North Carolina, U.S.A.)

Tuesday, January 19 through  
Saturday, January 30,  
in the Sarnen Shopping Center

Traveling exposition about modern oral and dental hygiene to prevent tooth decay, dental plaque and bleeding gums. This encompassing information is presented under the sponsorship of the Swiss Public Health Office in Bern, and with the contribution by the Dental Institute of the University of Zurich and the Zurich Dental Hygiene School.

Within the «ultraviolet tunnel,» you will be able to experience fluorescent dental plaque formation. If this still does not motivate you towards perfect dental plaque control, you can also view plaque germs at 500x magnification, the germs that lead to tooth decay and gum disease. Swiss Dental Hygienists will be on hand to teach you how to effectively eliminate these disease-causing germs in your mouth. This is a demonstration that you should experience with your whole family.

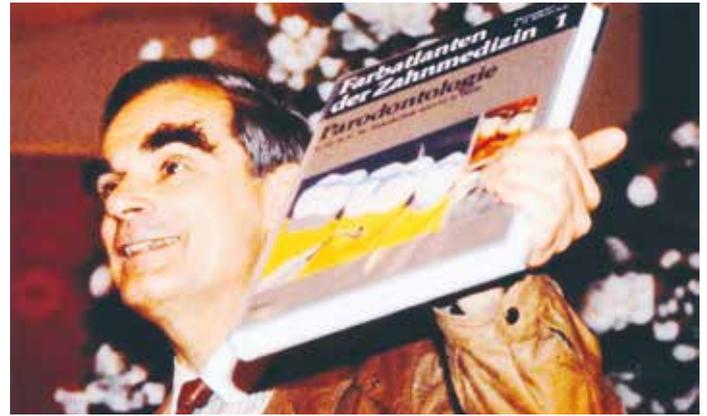
Students in dental and other health professions will also benefit greatly in the experience of this important demonstration.

Wednesday and Friday,  
late shopping until 9:00 p.m.!

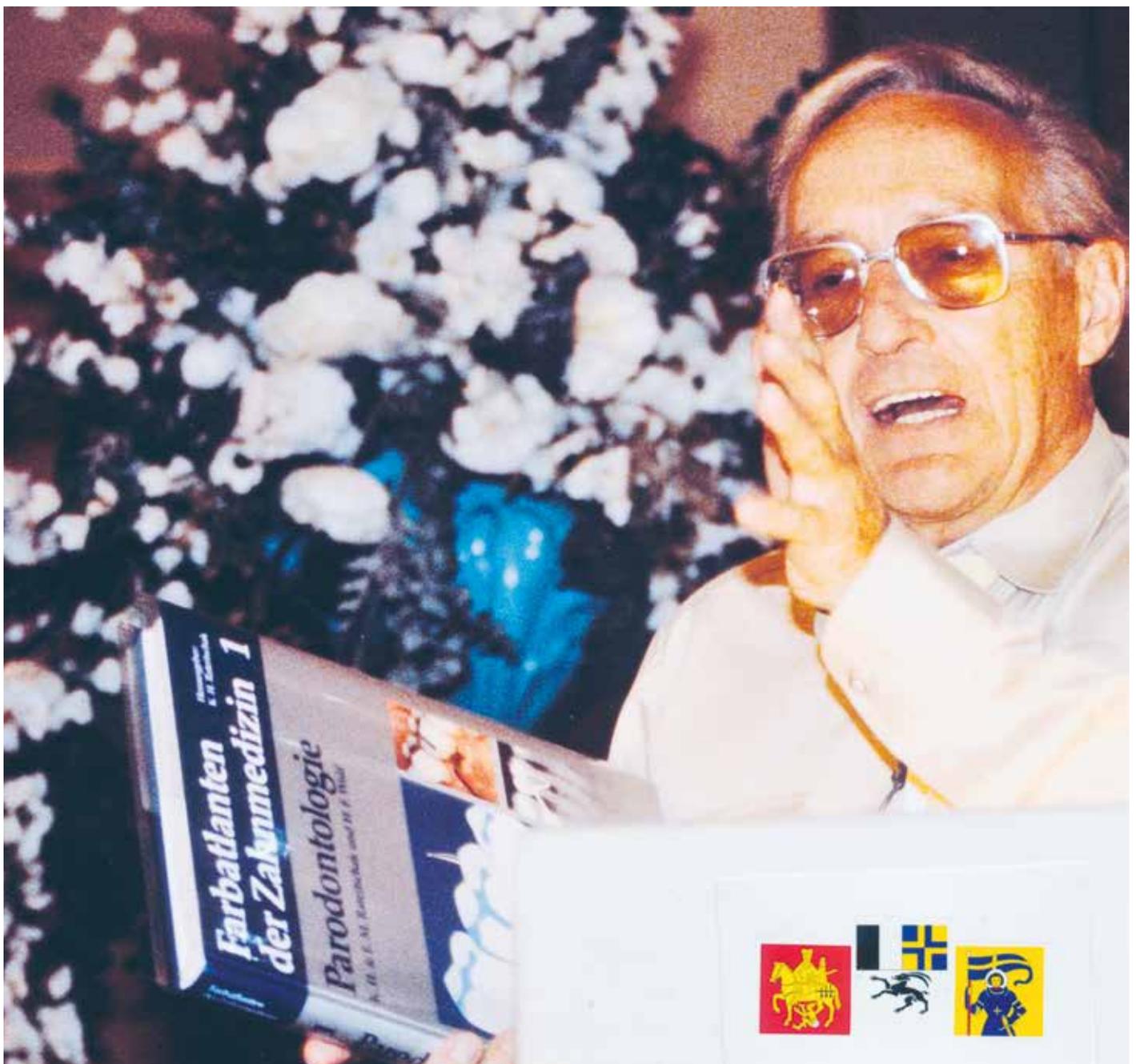
The travelling exhibition «Health smile – joyful mouth» was displayed in department stores and shopping centers for eight years running, all over Switzerland.

icine in Switzerland and in Europe generally. Many of his past students and co-workers were to be found in leadership positions in Switzerland and around the world.; they carried his message into the future. But «Mühli» remained active in the development of dental medicine, and he cherished his many contacts in the profession.

HERBERT F. WOLF: «Mühli» was happy to enter a less hectic time. Finally he would be able to pursue his hobbies, attend meetings and exhibitions, time for which he had never had before, and he could dedicate himself to his family and friends. But let me just tell you about two things that seemed to really touch him deeply after he retired. At the periodontology convention in Flims in 1984, 20 years after the famous St. Moritz CE courses, Klaus Rateitschak gave to Mühli the first copy of the long-awaited new book «Color Atlas of periodontology,» which was dedicated to Mühlemann, our teacher and mentor. He was speechless; he couldn't find the words. But on the next day, he expounded his overwhelming joy in a moving letter (see below).



At the periodontology convention in Flims in 1984, Klaus H. Rateitschak gave «Mühli» the first edition of «Color Atlas of Periodontology,» which was dedicated to Mühlemann.



Mühli was almost speechless, totally surprised.

Hans R. Mühlemann

Lieber Herr

Eben habe ich 2 Stunden lang in Eurem einzigartigen Atlas geblättert und gelesen. Jeder mit der Kommunikation Vertraute muss vorerst über die Perfektion der Grafik, Ihres Aufbaues und tadellosen Druckes staunen. Allein die Aufmachung dieser seltenen Meisterleistung verdient internationale Beachtung und öffentliche Würdigung. Ich freue mich jetzt schon, bei diesem unabwendbaren Anlass dabei sein zu dürfen.

Auch das Fachliche beeindruckt mich. Glücklicherweise konntet Ihr der Versuchung widerstehen, die ganze Parodontalchirurgie in Frage zu stellen oder Sklaven einseitiger Auffassungen zu werden. Ihr macht dem Praktiker auf neue, originelle Art erstmals klar, wie hart erarbeitete wissenschaftliche Erkenntnis zwangsläufig den Weg in die klinische Tätigkeit pflastern muss. Der Zahnarzt beginnt beinahe spielerisch das Wesen und die Ursachen der Parodontalerkrankungen zu verstehen und in der täglichen Arbeit die richtigen Akzente und Prioritäten zu setzen. Er kann sich der Nachvollziehbarkeit Eurer Empfehlungen und Erfolge nicht entziehen.

Persönlich hat mich Eure grosszügige Widmung dieses Meilensteins in der Parodontologie-Literatur sehr bewegt. Bei der Uebergabe fand ich kaum die richtigen Worte. Wohl verbindet uns das Fach, jedoch verdanke ich Eure Dedikation als Ausdruck der Ueberzeugung, dass wissenschaftliche Erkenntnisse und deren Weitergabe am schönsten und eindrücklichsten auf dem Boden menschlicher Grosszügigkeit, Freundschaft und in einem Klima der Freiheit und des gegenseitigen Respektes wachsen. Der Beweis ist evident.

Ich wünsche Eurem Atlas den ausserordentlichen Erfolg, den er verdient. Mit nochmaligem grossen Dank

Euer

Dein H. R. M.

Zürich, 13. September 1984  
HRM/Fe/R.

In his thank you letter to authors Klaus H. Rateitschak and Herbert Wolf, Mühlemann expressed his enormous joy and enthusiasm.

# Mühlemann's letter to K. H. Rateitschak and Herbert F. Wolf

(Translated by Prof. Dr. med. dent. Thomas Michael Hassell, B.S., D.D.S., Ph.D.,  
C.B.A., High Point, North Carolina, U.S.A.)

Dear Herbi,

I have just spent two hours reading and perusing your exceptional Color Atlas of Periodontology. Anybody who is involved in print communication must wonder at the perfection of the graphics, the fundamental organization and the flawless color reproduction. Just the mise-en-scène of this rare masterwork demands international recognition and public appreciation. I am so very happy to own a copy of this incomparable literary work.

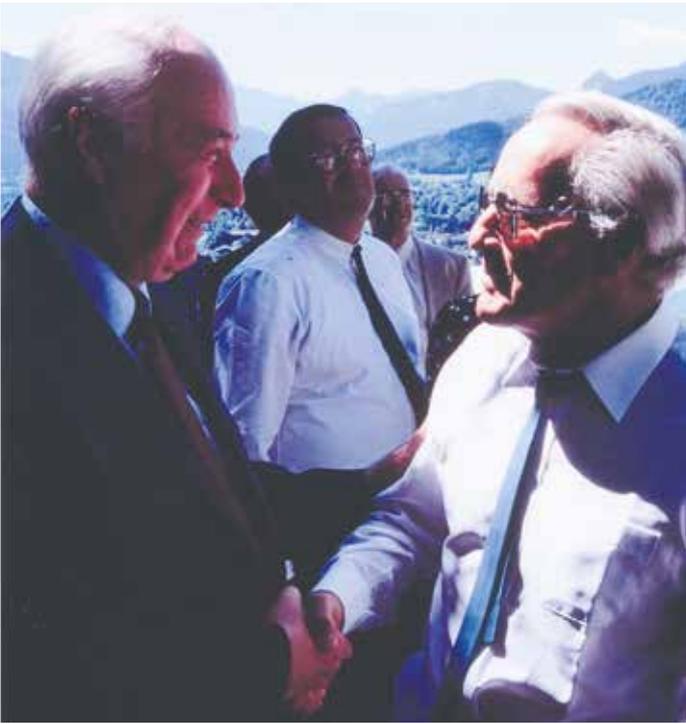
I am also very impressed by your professional approach. You have accomplished a tremendous goal: You have not put periodontal surgery in question, and you have not been slaves to conventional wisdom. You have challenged all practitioners in a completely original way to accept the results of hard-fought scientific research findings, and to incorporate those new findings into clinical practice. The dentist who carefully reads this book will gradually absorb the knowledge of the etiology of periodontal diseases, and the necessity to incorporate this new knowledge with the correct accents and priorities. The dental practitioner cannot remove him/herself from the possibility of successfully adopting your recommendations.

On a very personal note, the fact that you have dedicated this milestone in the periodontal literature to me moves me greatly. I am left without finding the right words. Our profession connects us, but I am thankful for your dedication as an expression of your convictions that scientific findings and knowledge and their perpetuation represent the most beautiful and influential foundation for human generosity, friendship and an atmosphere of freedom and mutual respect. The proof is evident.

I wish you extraordinary success with this Atlas, which it so obviously has earned. With my greatest thanks,  
I remain,  
Yours truly,

Zurich, 13 September 1984

In his thank you letter to authors Klaus H. Rateitschak and Herbert Wolf, Mühlemann expressed his enormous joy and enthusiasm.



Extraordinary meeting of two giants in periodontology: Prof. Sigurd P. Ramfjord, Ann Arbor, Michigan (left) and Prof. Hans R. Mühlemann (right) at a convention in Tegernsee, 1985.

Later, in 1985, Mühli experienced another moving moment when he was invited to attend a conference organized by Dr. Horst-Wolfgang Haase, Editor-in-Chief of Quintessence Publishers, Berlin. Haase used the occasion to celebrate his 50th birthday, with many guests. The «European Celebrity» Mühlemann had just received Professor Tom Hassell's English language translation of the «Color Atlas of Periodontology» as he found himself standing in front of the «American Celebrity» Professor Sigurd Ramfjord from Ann Arbor, Michigan. Both men were amazed to finally meet each other, and their handshake was warm and firm. Professor Ramfjord spoke fondly of the German translation of his own textbook: «Periodontology,» by Ramfjord and Ash.

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*With this meeting of two great men of dentistry, I take the opportunity to thank you, Dr. Wolf and Dr. Saxer, for your participation in this interview.*

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Mühli in 1981 in deep discussion with a pensive Professor Niklaus P. Lang.

**Contacts:**

*Dr. med. dent. Herbert F. Wolf*  
*wolf.maya@bluewin.ch*

*Prof. Dr. med. dent. Ulrich P. Saxer*  
*u.p.saxer@icloud.com*

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## Selected contributions

- Maternal Depression Increases Childhood Dental Caries: A Cohort Study in Brazil: **dos Santos Pinto, G.; de, Ávila Quevedo, L.; Britto Correa, M.; Sousa Azevedo, M.; Leão Goettems, M.; Tavares Pinheiro, R.; Demarco, F.F.** (Pelotas)
- MMP20 rs1784418 Protects Certain Populations against Caries: **Filho, A.V.A.; Calixto, M.S.** (Recife); **Deeley, K.** (Pittsburgh, PA); **Santos, N.; Rosenblatt, A.** (Recife); **Vieira, A.R.** (Pittsburgh, PA)
- Matching the Statistical Model to the Research Question for Dental Caries Indices with Many Zero Counts: **Preisser, J.S.** (Chapel Hill, NC); **Long, D.L.** (Birmingham, AL); **Stamm, J.W.** (Chapel Hill, NC)
- Unstimulated Saliva-Related Caries Risk Factors in Individuals with Cystic Fibrosis: A Cross-Sectional Analysis of Unstimulated Salivary Flow, pH, and Buffering Capacity: **Alkhateeb, A.A.; Mancl, L.A.; Presland, R.B.; Rothen, M.L.; Chi, D.L.** (Seattle, WA)
- Protective Effect of Phosphates and Fluoride on the Dissolution of Hydroxyapatite and Their Interactions with Saliva: **Manarelli, M.M.; Pessan, J.P.; Delbem, A.C.B.; Amaral, J.G.; Paiva M.F.** (Araçatuba); **Barbour, M.E.** (Bristol)
- Enzymology and Ultrastructure of the in situ Pellicle in Caries-Active and Caries-Inactive Patients: **Kirsch, J.; Hannig, C.; Pötschke, S.; Basche, S.** (Dresden); **Bowen, W.H.** (Rochester, NY); **Rupf, S.; Trautmann, S.; Umanskaya, N.; Hannig, M.** (Homburg/Saar)
- pH Response and Tooth Surface Solubility at the Tooth/Bacteria Interface: **Mayanagi, G.; Igarashi, K.; Washio, J.; Takahashi, N.** (Sendai)
- Effect of 5,000 ppm Fluoride Dentifrice or 1,100 ppm Fluoride Dentifrice Combined with Acidulated Phosphate Fluoride on Caries Lesion Inhibition and Repair: **Fernández C.E. Tenuta, L.M.A.; Del Bel Cury, A.A.; Nóbrega, D.F.; Cury, J.A.** (Piracicaba)

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