MERCURY FROM AMALGAM FILLINGS TRACED TO ORGANS AND TISSUES!

Hahn, Leszek J.; Kloiber, Reinhard; Vimy, Murray J.; Takahashi, Yoshimi; and Lorscheider, Fritz L.

Dental "silver" tooth fillings: a source of mercury exposure revealed by whole-body image scan and tissue analysis.


**ABSTRACT:** "Mercury (Hg) vapor is released from dental "silver" tooth fillings into human mouth air after chewing, but its possible uptake routes and distribution among body tissues are unknown. This investigation demonstrates that when radioactive $^{203}$Hg is mixed with dental Hg/silver fillings (amalgam) and placed in teeth of adult sheep, the isotope will appear in various organs and tissues within 29 days. Evidence of Hg uptake, as determined by whole-body scanning and measurement of isotope in specific tissues, revealed three uptake sites: lung, gastrointestinal, and jaw tissue absorptions. Once absorbed, high concentrations of dental amalgam Hg rapidly localize in kidneys and liver. Results are discussed in view of potential health consequences from long-term exposure to Hg from this dental material."

**AUTHORS’ CONCLUSION:** "Our laboratory findings in this investigation are at variance with the anecdotal opinion of the dental profession, which claims that amalgam tooth fillings are safe."

**THE AUTHORS:** This research study was conducted by the Departments of Radiology, Medicine, and Medical Physiology of the University of Calgary, Faculty of Medicine, Calgary, Alberta, T2N 4N1, Canada. Murray J. Vimy, D.M.D., F.A.G.D., F.I.A.O.M.T. is the dental member of the team. The other investigators are M.D.s or Ph.D.s in medical research. Purely dental researchers know dentistry, but are not expert on medical or physiological considerations. This research team and the research facility are highly qualified to investigate and evaluate the dental, medical, and physiological aspects of the use of dental mercury amalgam fillings. The safety of dental mercury amalgam fillings should, and will, be determined by the cooperative efforts of experts in the various human health disciplines and not by dentists alone.

**THE JOURNAL:** The FASEB Journal is the Official Publication of the Federation of American Societies for Experimental Biology--The American Physiological Society - American Society For Biochemistry and Molecular Biology - American Society for Pharmacology and Experimental Therapeutics - American Association of Pathologists - American Institute of Nutrition - The American
Association of Immunologists - The Society for Cell Biology. It consists of over 30,000 scientists in these human health investigative disciplines. It is a highly respected and esteemed organization that presents no bias on the issue of the safety of dental mercury amalgam fillings.

**THE EXPERIMENTAL PROTOCOL:** The sheep was selected as the experimental model for this study because it is an animal that closely approximates the human in its physiological function and response. In studies of the hard tissue of the teeth, such as the incorporation of fluoride into tooth enamel, sheep are not a good model because of differences in the mineral structure of the teeth themselves. But this was not a study of tooth enamel; it is a study of the fate and physiological effect of a dental filling material. For this purpose, sheep are a far better model than are hamsters, rats, mice, guinea pigs, or other commonly used animals.

The use of radioactively labelled mercury in the experimental fillings guarantees specificity and eliminates the need for control animals. Other possible sources of mercury such as food, air and water will not contain mercury that is radioactively labelled. Extreme measures were taken by the researchers to guarantee experimental accuracy.

Amalgam fillings were placed into 12 molar teeth of the experimental animal. The fillings were deliberately over-carved to a concave form to ensure that they would not wear excessively. Each filling contained approximately 425 milligrams of mercury which, according to literature reports cited by the authors, is about 50% of the mercury in an average molar amalgam filling in humans. The animal was then provided free access to water and fed fresh hay twice daily for 29 days, after which it was sacrificed and evaluated. During the 29 days post-chewing intra-oral mercury vapor measurements were periodically taken. These measurements closely approximated like measurements derived from human subjects in previously published studies. The fate of the dental amalgam mercury was determined by whole-body scanning and measurement of radioactive isotope in specific tissues.

The results of this study clearly demonstrate that "substantial quantities of Hg from amalgam will appear in various body tissues as early as 29 days after placement of amalgam fillings in teeth". The highest levels of mercury were found in kidney, feces, stomach, and liver. Substantial amounts were also found in the gum tissue, the alveolar bone surrounding the teeth, and the lining of the trachea. Even during this relatively short time Hg accumulation was also found in the heart tissue, the brain and several endocrine glands (pituitary, thyroid, adrenal, pancreas, and ovary). The levels of mercury found in the blood and urine were a great deal lower than levels found in most tissues.

In other studies on sheep performed by this research team run as long as 140 days, it was found that Hg from dental amalgam fillings will progressively accumulate in tissues and remain elevated with time. In humans, each dental amalgam filling remains in the tooth an average of 7-9 years and often much longer.

The authors pointed out that it has been scientifically established that mercury can cause autoimmune disorders and that this study established that dental amalgam fillings can be a major source of chronic exposure to mercury.

**EDITORIAL**

Previously published research has conclusively demonstrated that mercury is released from dental amalgam fillings and that the amount of mercury released is greatly increased by stressing the fillings with chewing or brushing. Several published human autopsy studies have found a direct correlation between the number of amalgam fillings present and the amount of mercury found in brain and kidney tissues.

This latest study clearly demonstrates that mercury from dental amalgam fillings transfers to numerous body tissues in a very short period of time. There can be no argument over the source of the mercury. It also establishes the entry routes into the body of the dental amalgam mercury. Besides the previously theorized lung inhalation and gastrointestinal absorption routes, this study also clearly identifies the tissues of the oral cavity as an entry route. Considering previously published research on the pathological effects of mercury on oral tissues, this finding adds significance to the consideration of mercury from dental amalgams as an additional factor in periodontal disease. Finally, this study further confirms the fact that measurements of mercury levels in blood and/or urine are not reflective of body burdens of mercury, particularly after exposure primarily to mercury vapor. This is significant and vital research, indeed.

As the authors of this study pointed out "Mercury (Hg) has been the major component of tooth filling
materials for the past 150 years and its use has met with continuing controversy, as clear evidence regarding its safety has not been demonstrated". It is a matter of record that the dental profession, until quite recently, has never even bothered to investigate potential health effects of mercury amalgam dental fillings. Opinions that this filling material is harmless when placed in human teeth are all based on evaluation of levels of mercury found in blood and/or urine, which are procedures well acknowledged to not be reflective of the body burden or toxic effects of mercury.

This landmark study represents a new quality of research on the potential health effects of mercury from dental amalgam fillings that has become apparent in recent years. The question is no longer being left to strictly dental investigators. Qualified investigators in other health disciplines have become involved. Moreover, publication in the FACEB Journal is significant. It means that a large number of health science experts will now become aware of the issue.

Three things are becoming increasingly clear. It is obvious that the controversy over the use of mercury amalgam dental fillings is no longer confined to the dental profession. Secondly, it is also becoming clear that the position of the dental profession that mercury amalgam dental fillings are totally harmless to human patients (unless they are allergic to mercury) is based on a dangerously insecure scientific foundation. All over the world scientists, physicians, government officials, environmentalists, and patients are discovering this uncomfortable situation. Thirdly, the patient must be advised when a toxic material is to be implanted in their teeth, the potential hazards of the material, the alternative materials available and be extended their constitutional right to freedom of choice and informed consent. The time has come for organized dentistry to seriously and honestly reevaluate its position.

In this regard, several state legislatures have been made aware of the potential toxicity of mercury amalgam dental fillings and the lack of dental patient freedom of choice and informed consent. The first to take some formal investigative action is the State of Illinois. The Eighty-Sixth General Assembly, Illinois House of Representatives recently adopted the following House Resolution No. 1084. Offered by Representative Cowlishaw:

WHEREAS, It is a common dental practice in Illinois to use an amalgam of materials for dental fillings; and
WHEREAS, This dental amalgam, thought by the public to be made only of silver, is actually 50% mercury; and
WHEREAS, Studies have shown that toxic mercury vapors can leak from fillings into the blood system and cause serious health problems, particularly in persons with allergies or chemical sensitivities; and
WHEREAS, Dental patients often lack information that would enable them to avoid having mercury used for their fillings; therefore be it
RESOLVED, BY THE HOUSE OF REPRESENTATIVES OF THE EIGHTY-SIXTH GENERAL ASSEMBLY OF THE STATE OF ILLINOIS, that this body hereby requests that the Illinois Department of Public Health review the studies that have examined the health risks of mercury in dental fillings and report to the General Assembly by March 1, 1990, its findings about such risks as well as its recommendations for providing a means by which dental patients may be informed of the findings and of the alternatives to mercury content in fillings when seeking dental treatment; and be it further
RESOLVED, That a copy of this preamble and resolution be presented to the Director of the Illinois Department of Public Health.

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IS DENTISTRY POLLUTING THE ENVIRONMENT WITH MERCURY???
Recent articles in the ADA News (9 October 1989) and The Arizona Daily Star (16 October 1989) are sending shock waves through the dental community and drawing the interest of environmentalists and other citizens. The newspaper article was entitled "County Says Dentists are Dumping Excess Mercury"; the ADA response was "Arizona mercury decision 'misguided'".

Pima county (Tucson) Wastewater Management Department officials, working with the U.S. Environmental Protection Agency, have determined that dentists' offices are illegally dumping mercury into treated sewer water. Excess mercury was found in the Santa Cruz River, which is downstream from
the county’s two sewer treatment plants, and officials traced the source to local dental offices. The county temporarily closed seven dental offices because of excessive mercury dumping.

The USEPA is ordering the county to keep mercury out of the Santa Cruz, which supports a large and complex array of plants and animals. Officials of the Arizona Game & Fish Department supported the county’s action and pointed out the threat to wildlife caused by the mercury pollution.

Arizona Dental Society officials deny the allegations. According to the president of the Southern Arizona Dental Society: "There is mercury in the amalgam, but it’s OK to put amalgam in your mouth and it’s OK to put it in a landfill". Dental officials contend that free mercury is not available in amalgam once the metals are mixed together. [BIO-PROBE COMMENT: This is the very same ‘mercury is locked-in the amalgam filling once it is placed in the teeth’ explanation now conclusively disproved by numerous published scientific research studies.] Basing their position on this explanation, the dental officials maintain that the mercury pollution must be coming from other sources, not dental offices.

The Pima County Wastewater Management Department contradicted the dental officials. They routinely check all local users of mercury and found mercury only in the sewer lines of dental offices, but not in sewer lines of anyone else. A check of county records since 1985 supported the WMD position. Of the 73 mercury violations since 1985, dental offices violated the mercury limit 71 times and hospitals exceeded it twice.

These events in Arizona are supported by world-wide attention devoted to the environmental aspects of the use of mercury in dentistry. At least one dental school in Tokyo, Japan was temporarily closed for polluting waste water with mercury. In West Germany, attempts are underway to evaluate dentistry’s contribution of mercury to waste water. Most importantly, the recent dramatic announcement of the intention to ban dental amalgam in Sweden was made by that country’s Chemical Inspection Agency, which has the responsibility for environmental pollution.

DENTISTRY’S OBLIGATION TO THE ENVIRONMENT.

Obviously, dentistry has an obligation to the environment as well as the patient. It would be helpful to first understand the extent of the problem, which is two-fold: 1) New mercury added to the pool each year by the placement of new amalgam fillings; 2) The removal of existing amalgam fillings. Mercury amalgam fillings are removed for a variety of reasons and are replaced with new amalgam fillings, gold inlays, crowns, or composites.

According to U.S. government information on the amount of mercury used in dentistry each year and American Dental Association estimates of the number of dentists in the country, amalgam-using dentists use at least 2 pounds of mercury per year. Estimating that approximately 100,000 of the nation’s 140,000 or so dentists use amalgam (excluding specialists and mercury-free general dentists), this adds about 200,000 pounds (100 tons) of new mercury to the pool annually. No figures are available as to how much of this is placed into teeth and how much of the excess mixed amalgam is discarded and disposed of. If only 10% (certainly a conservative estimate) of the mixed amalgam is thrown away or carved away from the top of the filling and washed down the drain, 20,000 pounds (10 tons) of mercury is immediately added to the environment annually in the United States in this manner. This leaves 180,000 pounds (90 tons) of mercury going into the teeth of U.S. citizens each year.

Since there is no data available on mercury disposal of removed amalgam fillings, we shall try to make reasonable and conservative estimates. All general practice dentists (non-specialist), whether or not they place mercury amalgam fillings, remove them. A reasonable and conservative estimate would be the removal of 5 amalgams per day. Dentists work at least 200 days per year, so each GP dentist removes at least 1000 amalgam fillings per year.

According to Craig’s textbook on Dental Materials, each average sized amalgam filling contains 780 milligrams of mercury. Being as conservative as possible, we shall use the figure of 680 milligrams, which is 0.68 grams (1000 milligrams= 1 gram), for the amount of mercury in each removed amalgam. The amount of mercury in 1000 removed amalgam fillings would therefore be at least 680 grams, which is 0.68 kilograms (1000 grams= 1 kilogram). Since there are 2.2 pounds to a kilo, each GP dentist contributes at least 1.5 pounds of mercury (2.2 x 0.68) to the environment each year just from the removal of old mercury.
amalgam fillings. Since these are very conservative estimates, the amount could be much more. So if a state 
has 1000 dentists, that is over 1500 pounds of mercury going into the environment each year in that state.

Where does it all go? Dentists drill out the old amalgams. The material is mixed with water and either 
vacuumed out of the mouth or spit into a sink. In either case, it goes out into the waste water. Dental offices 
have, or should have, traps in the lines to catch large particles of amalgam. These traps allow the water, 
and smaller particles of amalgam, to pass through. These traps will also allow the passage of free 
(elemental) mercury. The question of the stability of mercury within an amalgam mixture has already been 
settled. Mercury is not 'locked in' the amalgam. That has been repeatedly proven scientifically. Any 
number of forces will cause the release of mercury from mixed amalgam.

We at Bio-Probe are not experts on water treatment, but we did make an effort to learn what we could 
about the subject in a short period of time. We wish to express appreciation to Warren Clough (Ozark Water 
Analysis Co. Sulfur Springs, Arkansas. Tel: 800-835-8908) and Tim Robbins (Sears Home Improvement 
Dept. Orlando, Florida) for their prompt and willing cooperation in providing the following information. 
We will pass on to you additional information as it becomes available.

There are filters available that will remove small particles of amalgam and even elemental mercury from 
water. Carbon filters and ceramic filters will remove small particles, but not elemental mercury. They must 
be inserted into the plumbing and changed or cleaned on a regular basis. The only filters that will remove 
elemental mercury are reverse osmosis filters. Unfortunately, these filters are impractical for use in dental 
office waste systems. Only 25% of the water passes through the reverse osmosis filter to become 
decontaminated water. The remaining 75% is diverted to become waste water which still must be disposed of.

So none of these filters are practical solutions to the problem. Furthermore, none of these filters remove 
the mercury from the environment. They remove the mercury only from the waste water, so the problem 
of environmental contamination is not really solved; it is only diverted to another location.

Until better solutions are provided there are two approaches to minimizing dentistry's contribution to 
environmental mercury contamination.

1. 'Section' or 'dissect' the amalgam filling for removal. Most dentists simply drill away the old 
amalgam, which results in very fine particles mixed with water that easily pass through the traps. Sectioning 
entails using a small burr to cut the amalgam filling into pieces for easy removal. The sections will easily 
pop out of the tooth. Dissecting the amalgam filling out consists of using a small burr to cut away the 
circumference of the filling and popping out the entire filling. Both of these procedures minimize the 
amount of small particles of drilled amalgam that is mixed with water and provide large chunks of amalgam 
that are easily caught by existing traps. The traps should be emptied and cleaned regularly as it has now 
become obvious that water passing through the trapped amalgam particles will result in mercury leaching 
into the water.

2. Minimize or eliminate the amount of new mercury added to the pool each year by dentistry. Sweden 
is taking the dramatic approach by simply banning the use of amalgam altogether, based on environmental 
as well as patient health concerns. An argument can be made that this eliminates the 'freedom of choice' 
for those patients who elect to have mercury amalgam fillings on an informed basis. Does the patient's 
freedom of choice superecede concerns for the environment, or not?

Where do we go from here? It is obvious that the practicing dentist cannot totally avoid contaminating 
the environment with dental mercury at this time! Does the dental profession have an obligation to the 
environment, or not? If so, who in the dental profession bears the responsibility? Practicing dentists can 
stop adding to the pool of dental mercury by refusing to place new mercury amalgam fillings, but they 
cannot stop removing them.

Dental practice policies and procedures have always been determined by what is commonly called 
"organized dentistry". This consists of a coalition of the American Dental Association with its constituent 
state and local bodies, the state Boards of Dentistry, the dental schools, and governmental dental agencies. 
Since these groups determine and dictate dental policies and procedures, the responsibility for ensuring the 
safety of the environment (and the patient) rests on their shoulders.

Practicing dentists do not have the financial resources or the manpower to solve this problem. Organized
dentistry does. Steps should be taken immediately to find ways to protect the environment from dental mercury. If the dental profession does not willingly face its responsibility in this issue, it may soon find itself forced to do so, under extremely uncomfortable circumstances.

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ABSTRACTS

Johansson, A; Curstedt, T; Robertson, B; Camner, P.
Lung lesions after experimental combined exposure to nickel and trivalent chromium.
Rabbits were exposed to a combination of 0.7 mg/m$^3$ of nickel (Ni$^{2+}$) as NiCl$_2$ and 1.2 mg/m$^3$ of chromium (Cr$^{3+}$) as Cr(NO$_3$)$_3$, to 0.6 mg/m$^3$ of Ni$^{2+}$ as NiCl$_2$, or to filtered air for 4 months (5 days/week, 6 hr/day). Light microscopy of the lung tissue showed widespread areas with nodular accumulation of macrophages in all rabbits exposed to both metals, in two rabbits exposed to nickel alone, and in none of the controls. Pathology included attenuated septa, alveoli stuffed with surfactant-like material and densely packed debris, and obscure cell borders. The reaction in the group exposed to nickel alone was less prominent. Compared to controls, the volume density of alveolar type II cells showed a four-fold increase after exposure to both metals and a two-fold increase following exposure to nickel alone.
The authors concluded: "Our observations raise the concern that noxious effects might occur also in humans exposed to a combination of nickel and trivalent chromium".

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Glasscock, N. et al. (VAMC and UM, Ann Arbor, ML.)
Recorded changes in quality of crown & bridge restorations: 84 month report.
Over 800 dental units distributed among four "alternative alloys" were evaluated at 1 month (baseline), 6 months, 12 months, 24, 36, 48, 72, and 84 months for 11 well defined criteria and for overall performance using a paired t-test. Three of the four dental alloys were nickel-chromium alloys (Ticon, Ceramalloy II, and Micro-Bond N/P2) and the fourth (W-1) was a palladium-silver alloy. Conclusions: 1) All alloys are deteriorating with prolonged clinical function for most criteria and overall performance - most statistically significantly; 2) clinically significant deterioration has been documented - for the first time - for several criteria and overall performance; and 3) Ceramalloy II has consistently performed worse than Ticon, Micro-Bond N/P2 and W-1.

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Wataha, JC; Craig, RG; Hanks, CT.
Analysis of culture medium for elements dissolved from casting alloys.
Atomic absorption spectroscopy was employed to detect metallic elements in cell culture medium in contact with 5 experimental dental casting alloys of known composition. It is accepted that dissolution of elements into interstitial fluid is needed to produce a cytotoxic reaction. Previous investigations had shown these alloys to be cytotoxic to Balb/c 3T3 cells. Most elements present in the casting alloys (including gold) were detected in the 3 day cell culture mediums. Concentrations for the different elements ranged from 100 ppb to 28 ppm. In no case was only a single element detected in the medium. The ratio of the concentration of an element in the cell culture medium to the atomic percent of the element in the alloy was found to range from 0.001 to 2.0 ppm/at %. It was concluded that most elements in these casting alloys dissolved to some extent into the cell culture medium, but that some elements, such as Cd (cadmium), Cu (copper), Ga (gallium), Ni (nickel), and Zn (zinc) dissolve preferentially to Au (gold), Ag (silver), and Pd (palladium).

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Vougiouklakis, G. et al. (U of Athens Faculty of Dentistry and NTU, Greece.)
Galvanic corrosion of prosthodontics alloys with high and low Ag content high Cu amalgams.
High copper amalgams with high or low silver contents do not contain the gamma 2 phase in contrast to the conventional amalgams. However, the presence in the oral cavity of various prosthodontics alloys can affect the corrosion process of the amalgams. The purpose of this in vitro investigation is to measure the galvanic corrosion of two amalgams combined in galvanic systems with three prosthodontics alloys. The amalgams used were one of high-Cu, high-Ag content (Tytin) and one of high-Cu, low-Ag content (ANA 2000). The prosthodontics alloys were one nickel-chromium base metal alloy (Ceramalloy II), one silver-palladium (Ney 76), and one gold-platinum alloy (Ney-Oro G3). A 1% NaCl solution at a constant temperature of 36 degrees Celsius (+ or - 1 degree) was used as the corrosion medium. The following methods were used: 1. Measurement of the potential of the galvanic cells amalgam/NaCl/NaCl/alloy. 2. Determination of the dissolution rates of Hg, Ag, Sn, and Cu up to 6 months of the systems amalgam/alloy by atomic absorption spectroscopy. 3. SEM examination of the corroded specimens. The potentials of the galvanic cells ranged from 10-140 millivolts. The total amounts of dissolved metals after 6 months were 1.15-3.00 mg/cm². According to the results of the present investigation we came to the conclusions that: a) The galvanic corrosion of amalgam A is in all the combinations the worst and b) for amalgam A the worst combination in regard to corrosion is with the silver-palladium prosthodontics alloy and for amalgam T were both with silver-palladium and nickel-chrome alloys.

**BIO-PROBE COMMENT:** In June of 1985 a research team at the University of Tennessee College of Dentistry published a study in the Journal of Prosthetic Dentistry [See Bio-Probe Newsletter 2(6):8. Sept 1985]. Fourteen dental casting alloys were analyzed for release of nickel and beryllium into acidic salivary solutions in vitro. The authors concluded that "nickel-beryllium dental casting alloys possess the potential to be a significant hazard to the laboratory technician, dentist, and patient". In 1987 another research team at the University of Michigan School of Dentistry and VA Medical Centers evaluated the use of base metal casting alloys in dentistry. They pointed out the hazards and advised the medico-legal need for "informed consent" if these alloys were to be used in patients. Their study was also published in the Journal of Prosthetic Dentistry [See Bio-Probe Newsletter 4(4):14. Sept 1987]. The current research presented in this newsletter emphasizes the previously determined hazards of the use of base metal alloys in dentistry. It has been estimated that 75-85% of the crown and bridge units now being placed are base metal alloys. Moreover, these alloys are routinely placed in oral cavities already containing numerous mercury amalgam fillings. The time has come for the dental profession to seriously consider the health effects of dental materials rather than solely their hardness and longevity!

**Guillermine G, Adriana TM, Monica EM.**

The implication of renal glutathione levels in mercuric chloride nephrotoxicity.


**ABSTRACT**

The effects of renal glutathione (GSH) depletion on renal injury following a single injection of mercuric chloride (HgCl₂) were evaluated in the rat. Animals were injected with different doses of HgCl₂ and the renal function were studied 1 hour later. Diethylmaleate (DEM) (4mmol/kg body wt, i.p.) induced a significant depletion of GSH by reducing renal GSH levels to 25% of control values. This effect lasted for 6 hours. HgCl₂-induced nephrotoxicity, as measured by fractional excretion of glucose, lithium, sodium, potassium and water was increased in rats treated with DEM. The time course of HgCl₂ nephrotoxicity was also investigated by determining the renal function of different times after HgCl₂ and HgCl₂ plus DEM injection. Renal impairment was significantly marked in rat depleted of GSH.

**Jaro Pleva, Ph.D.**

Corrosion and mercury release from dental amalgam.


**ABSTRACT**

Corrosion attacks on twenty-two dental amalgam restorations after in vivo service have been studied by Scanning Electron Microscopy together with the Energy Dispersive X-Ray Technique, and by optical
microscopy. From the measured depth and type of corrosion attack, estimates of released mercury amounts are made.

The amalgam fillings have been obtained from members of a group of 250 individuals, who suspected their health troubles potentially to be chronic mercury poisoning from amalgam and were to have all amalgam fillings removed. Three typical patient cases are presented.

Model calculations of released mercury, based on previously published measurements of corrosion currents with and without abrasion are also given.

The investigations show, that the long-term release of mercury from a few amalgam fillings will often reach or exceed the recommended limits for daily intake of mercury. Hence mercury from corroding amalgam fillings represents a potential health hazard. Danger of galvanic contact between amalgam and gold restorations is particularly emphasized. (BIO-PROBE will publish a more detailed review of Dr. Pleva’s work in the next issue of the Newsletter)

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FORUM

The International Academy of Oral Medicine and Toxicology (IAOMT) will hold its winter regional scientific session and board meeting February 17 & 18, 1990 in Tucson, Arizona. The meeting will be at the Viscount Hotel, 4855 East Broadway, Tucson AZ 85711. (602) 745-6500, $99.00/night (single or double).. State you are with IAOMT meeting when making reservations, includes American breakfast buffet; transportation to and from the airport by Arizona Stage Coach van. The subject of the Saturday February 17, 1990 scientific session will be Toxins in the Dental Office. The Board Meeting will be Sunday February 18, 1990, from 8:30 A.M. - 12:30 P.M. and non-board or Academy members are invited to sit in.

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International Symposium On The Environment, Occupational, and Patient Health Hazards of Mercury Amalgam (Silver) Fillings to be held Friday March 30, 1990 in Raleigh, North Carolina. The meeting will take place in the North Carolina Senate Auditorium. Michael Fleming, D.D.S. Moderator. Speakers are Mats Hanson Ph.D, Sweden; Sandra Denton, M.D., Alaska; David Kennedy, D.D.S., California; Michael F. Ziff, D.D.S., Florida; Hal Huggins, D.D.S., M.S., Colorado; Robert Reeves, J.D., Kentucky; Jim Pearce, Environmental Action Foundation, Washington D.C.; Doug Rader, Environmental Defense Fund, Washington D.C.. In addition representatives of the top ten environmental groups in the United States, National Health Federation, and CANAH will be in attendance. Write to Elizabeth Ridonour, 3F Fountain Manor, Greensboro, NC 27405 for invitation to attend. There is no charge to attend but because of seating considerations, attendance will be limited.

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The Holistic Dental Association will hold its 1990 Annual Meeting March 30 & 31st, 1990 at the Hyatt Regency Hotel in Columbus, Ohio. Outstanding Clinical TMJ authorities in the United States will be sharing their clinically proven techniques for Successful TMJ Treatment. In addition there will be major workshops on Nutrition in Dentistry; Homeopathy in the Dental Practice and Dento-Cranial Therapy. Hyatt Regency Columbus, 350 North High Street, Columbus OH 43215, (614) 463-1234. Convention rate for attendees is $89.00 per room for one or more persons. To insure the $89.00 rate please book your rooms prior to March 8, 1990. For more information call (614) 366-3309 or write H.D.A., 974 North 21st St., Newark, OH 43055

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The American Academy of Biological Dentistry presents "Solutions for the alternative health care practitioner" by John Yiamouyiannis, Ph.D. and "The physics of living system" by Douglas Leber, February 3-4, 1990 at the Carmel Mission Inn, Carmel, CA. For more information call (408) 659-5385 or (209) 838-3522, or write American Academy of Biological Dentistry, P.O. Box 856, Carmel Valley, CA 93924.