



Episode 614 | January 29th, 2021 | 12:00 PM EST

Ventilation, Air Filtration, and COVID-19, “Avoiding the Snake Oil Salesman”

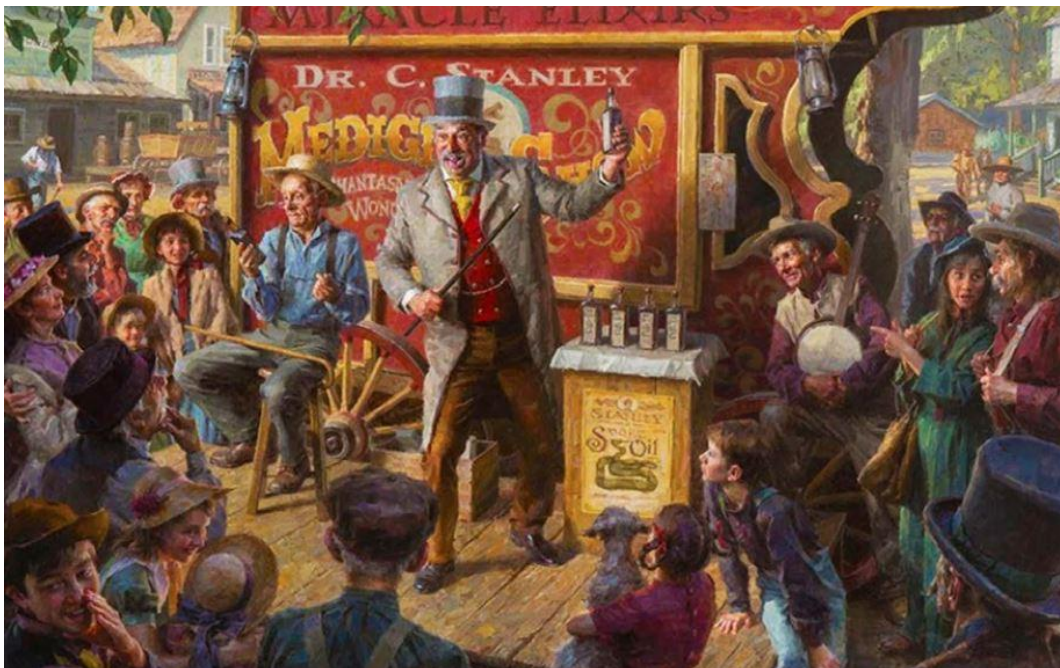
Francis “Bud” Offermann, MSME, PE, CIH

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The Snake Oil Salesman (Morgan Weistling)

This week we welcomed back Francis “Bud” Offermann for a discussion of ventilation, air filtration and COVID 19 Avoiding the Snake Oil Salesman. Mr. Offermann is president of Indoor Environmental Engineering, a San Francisco based IAQ consulting firm. Prior to starting up Indoor Environmental Engineering, Mr. Offermann was a Staff Scientist with the Building Ventilation and Indoor Air Quality Program at Lawrence Berkeley National Laboratory. He has been a recipient of research grants regarding building air quality and ventilation field studies, tracer gas techniques, contaminant emission rate measurements, and performance testing of air cleaning devices.

Mr. Offermann served as an expert witness for the U.S. Federal Trade Commission regarding the performance claims found in advertisements of air cleaners. He also provided consultation to the American Home Appliance Manufacturers (AHAM) during the development of AHAM Standard AC-1, which is used to measure the Clean Air Delivery Rates (CADR) for portable air cleaners. He was also a past chairman of ASHRAE TC2.3 and SPC-145 committees for gas phase air filters and a corresponding member of ASHRE TC2.4 and SPC-52.2 for particulate air filters.

Nuggets mined from today’s episode:

In 1971, Bud left Buffalo, NY for Lawrence Berkeley National Laboratory where he began doing IAQ research on radon. This research initially focused on radon decay products. As these radon decay products attached to particles he became an aerosol scientist studying air filtration.

In 1985, Bud appeared on 60 Minutes TV show with Dan Rather to discuss air cleaners which were nothing more than air scenting machines that were making health claims.

He began working with AHAM (Association of Home Appliance Manufacturers, AHAM.org) which started a testing program for Clean Air Delivery Rate (CADR formula is Air Flow X Efficiency)

Link to Bud’s “Snake Oil Salesman” paper Link to Bud’s Snake Oil paper:
<https://www.iaqradio.com/wp-content/uploads/2021/01/The-COVID-19-Snake-Oil-Salesmen-Are-Here.pdf>

Link to article below and some of Bud’s slides:

THE ROLE OF BUILDING VENTILATION AND FILTRATION IN REDUCING RISK OF AIRBORNE VIRAL TRANSMISSION IN SCHOOLS, ILLUSTRATED WITH SARS-COV-2

<https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/CDPH%20Document%20Library/IAQ%20paper%20on%20school%20ventilation%20filtration%20viral%20transmission.pdf>

The goal is to protect occupants against long range transmission. HEPA filtration is approximately 100% effective in capturing all size particles. MERV 13 rated filters can remove up to 85% of airborne respiratory particles containing the SARS-CoV-2 virus.

Open Air Crusaders book from 1910, showed the efficacy of fresh air ventilation and sunlight on protecting students from tuberculosis. School was held outside on roof of building in winter. Students wore Eskimo suits.

<https://www.amazon.com/Open-Air-Crusaders-Elizabeth-Ventilation/dp/1331246776>

The air filtration industry has matured since pleated HEPA filters were invented in the 1940s during the Manhattan Project. HEPA filters rely primarily upon inertial impaction and diffusion to capture particles. Particles that are 0.3 μm are the most penetrating size particle.

Electrostatic precipitator (ESP) are filtration devices that removes fine particles, like dust and smoke, from a flowing gas using the force of an induced electric charge and oppositely charged collector plates minimally impeding the flow of gases through the unit. ESPs were used on nuclear subs. The drawbacks were that the collection plates got dirty which reduced particle removal efficiency and the devices created ozone. Also the development of high efficiency pleated filters with low pressure drop stole the market from ESPs.

Bipolar ionizers are devices looking for relevance and have not been shown to provide efficient particle removal.

ANSI/AHAM AC-1-2020 (Portable Electric Room Air Cleaners)

Method for Measuring Performance of Portable Household Electric Room Air Cleaners - ANSI/AHAM AC-1-2020

<https://www.aham.org/ItemDetail?iProductCode=30002&Category=PADSTD>

ASHRAE 52.2 MERV ratings

<https://www.nafahq.org/understanding-merv-nafa-users-guide-to-ansi-ashrae-52-2/>

Ken Whitby was a mentor of Bud's. Ken conceived the Dynamic Method for measuring Contaminate Removal Efficiency. ηQ_r Q_r =airflow (cfm) through device and η is the particle removal efficiency. Bud named this the Effective Cleaning Rate while studying control of respirable particles containing radon progeny.

The FTC hired Bud as an expert to assist in enforcement litigation and AHAM hired Bud to assist in developing the AMAM AC-1 standard portable air cleaner test method.

Ozone is not an air cleaner. Bud advocates for physical removal of materials with mold growth and advises against the use of ozone or biocides in mold remediation.

Bud's Snake Oil Article was written because nontraditional air-cleaning devices with unsubstantiated particle removal capabilities are being aggressively marketed to school districts across the country. Using the Wayback Machine he is able to find old information published on the internet (you can run but you cannot hide). He warns that electronic gizmos never reduce all of the target substance down to carbon dioxide and water vapor and can create formaldehyde and other hazardous and irritating compounds.

UV light isn't new. It's been used for TB. UV lights, partially covered by soffits installed in healthcare rooms don't have fans to push air up into the irradiation zone. UV lights installed in airstreams only give microorganisms a suntan. UV installed in disinfection cabinets or long duration irradiation of surfaces for sterilization works, UV in airstreams doesn't work.

Hydroxyl machines use the combination of titanium dioxide (sunscreen) deposited on interior surfaces of the devices and UV irradiates the surface to produce oxidizing hydroxyl radicals. We don't know the effects when hydroxyls dispersed, react and are inhaled.

FDA medical devices only need to demonstrate 4 log microbial reductions with no requirements for treatment duration (hours, days, weeks?)

Negative ions can offset cardiorespiratory benefits of PM_{2.5} reduction from residential use of negative ion air purifiers (Wei Liu) “Our findings suggest that negative ions, possibly along with their reaction products with the room air constituents, adversely affect health.”

<https://onlinelibrary.wiley.com/doi/10.1111/ina.12728>

Wildfire smoke during pandemic recommendations: During pandemic we are advised to ventilate with outdoor air. Don't turn outdoor air off completely and use MERV 13 or better filters. Extended surface filters (pleated) are mature, and the pressure drop across 2" or thicker filters is minimal.

Building Protection Factor. Guidance for Filtration and Air-Cleaning Systems to Protect Building Environments from Airborne Chemical, Biological, or Radiological Attacks

<https://www.cdc.gov/niosh/docs/2003-136/pdfs/2003-136.pdf>

Bud's website with many useful links.

<http://iee-sf.com/>

Final Comments:

Crystal ball sees increased use of sensors to monitor airborne particulate.

In schools, leave HVAC system fans in ON position during occupancy.

Beware of snake oil device claims citing: NASA and FDA

All these snake oil air cleaner claims, where is the FTC?

Now is not the time to save energy!!!!

Z-Man signing off

Trivia Question:

What ingredient in snake oil is known to have anti-inflammatory properties?

Answer:

Omega-3 fatty acids

Answered by: Don Weekes, Ottawa, Ontario Canada