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The Obscuration of Health Hazards : An Analysis of EPA Air Quality Standards

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The Obscuration of Health Hazards:
An Analysis of EPA Air Quality Standards

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A discrepancy between measured and observed air quality in comparison to that reported by the U.S. Environmental Protection Agency under poor conditions in real time has prompted an inquiry into the air quality standards in use by that same agency. This analysis, from the perspective of this researcher, raises important questions about the methods and reliability of the data that the public has access to, and that is used to make decisions and judgements about the surrounding air quality and its impact upon human health. The logic and rationale inherent within these same standards are now also open to further examination. The issues are important as they have a direct influence upon the perception by the public of the state of health of the environment and atmosphere. The purpose of this paper is to raise honest questions about the strategies and rationales that have been adopted and codified into our environmental regulatory systems, and to seek active participation by the public in the evaluation process. Weaknesses in the current air quality standards will be discussed, and alternatives to the current system will be proposed.

Particulate Matter (PM) has an important effect upon human health. Currently, there are two standards for measuring the particulate matter in the atmosphere, PM 10 and PM 2.5. PM 10 consists of material less than 10 microns in size and is often composed of dust and smoke particles, for example. PM 2.5 consists of materials less than 2.5 microns in size and is generally invisible to the human eye until it accumulates in sufficient quantity. PM 2.5 material is considered to be a much greater risk to human health as it penetrates deeper into the lungs and the respiratory system. This paper is concerned solely with PM 2.5 pollution.

As an introduction to the inquiry, curiosity can certainly be called to attention with the following statement by the EPA in 2012, as taken from a document (U.S. Environmental Protection Agency 2012,1) that outlines certain changes made relatively recently to air quality standards:

“EPA has issued a number of rules that will make significant strides toward reducing fine particle pollution (PM 2.5). These rules will help the vast majority of U.S. counties meet the revised PM 2.5 standard without taking additional action to reduce emissions.”

Knowing and studying the “rule changes” in detail may serve to clarify this statement, but on the surface it certainly conveys the impression of a scenario whereby a teacher changes the mood in the classroom by letting the students know that more of them will be passing the next test. Even better, they won’t need to study any harder and they will still get the same result.

In contrast, the World Health Organization (WHO) is a little more direct (World Health Organization 2013, 10) about the severity and impact of fine particle pollution (PM 2.5):

“There is no evidence of a safe level of exposure or a threshold below which no adverse health

effects occur. The exposure is ubiquitous and involuntary, increasing the significance of this determinant of health."

We can, therefore, see that there are already significant differences in the interpretation of the impact of fine particle pollution (especially from an international perspective), and that the U.S. EPA is not exactly setting a progressive example toward improvement.

Another topic of introductory importance is that of the AQI, or "Air Quality Index" that has been adopted by the EPA ("Air Quality Index – Wikipedia, the Free Encyclopedia" 2016). This index is of the "idiot light" or traffic light style, where green means all is fine, yellow is to exercise caution, and red means that we have a problem. The index, therefore, has the following appearance:

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

There are other countries that use a similar type of index and color-coded scheme. China, for example, uses the following scale ("Air Quality Index – Wikipedia, the Free Encyclopedia" 2016):

AQI	Air Pollution Level	Health Implications
0–50	Excellent	No health implications.
51–100	Good	Few hypersensitive individuals should reduce outdoor exercise.
101–150	Lightly Polluted	Slight irritations may occur, individuals with breathing or heart problems should reduce outdoor exercise.
151–200	Moderately Polluted	Slight irritations may occur, individuals with breathing or heart problems should reduce outdoor exercise.
201–300	Heavily Polluted	Healthy people will be noticeably affected. People with breathing or heart problems will experience reduced endurance in activities. These individuals and elders should remain indoors and restrict activities.
300+	Severely Polluted	Healthy people will experience reduced endurance in activities. There may be strong irritations and symptoms and may trigger other illnesses. Elders and the sick should remain indoors and avoid exercise. Healthy individuals should avoid out door activities.

As we continue to examine these scale variations, it will also be of interest to note that China is known to have some of the most polluted air in the world, especially over many of the urban areas.

Not all countries, jurisdictions or entities , however, use the idiot light approach that employs an arbitrary scaling method that is removed from showing the actual PM 2.5 pollution concentrations, such as those shown from the United States and China above. For example, the United Kingdom uses a scale ("Air Quality Index – Wikipedia, the Free Encyclopedia" 2016) that is dependent upon actual PM 2.5 concentrations, as is shown below:

Index	Ozone, Running 8 hourly mean ($\mu g/m^3$)	Nitrogen Dioxide, Hourly mean ($\mu g/m^3$)	Sulphur Dioxide, 15 minute mean ($\mu g/m^3$)	PM2.5 Particles, 24 hour mean ($\mu g/m^3$)	PM10 Particles, 24 hour mean ($\mu g/m^3$)
1	0-33	0-67	0-88	0-11	0-16
2	34-66	68-134	89-177	12-23	17-33
3	67-100	135-200	178-266	24-35	34-50
4	101-120	201-267	267-354	36-41	51-58
5	121-140	268-334	355-443	42-47	59-66
6	141-160	335-400	444-532	48-53	67-75
7	161-187	401-467	533-710	54-58	76-83
8	188-213	468-534	711-887	59-64	84-91
9	214-240	535-600	888-1064	65-70	92-100

Notice that the PM 2.5 concentration for the U.K. index is directly accessible and that the scaling for the index is dramatically different than that for the U.S. or China. In the case of the AQI used by the U.S. and China (and other countries as well), a transformed scale runs from 0 to 300-500 with concentration levels that are generally more obscure and ambiguous within the index. In the case of the U.K index, the scale directly reports with a specific PM 2.5 concentration level with a maximum (i.e., ~70 ug/m^3) that is far below that incorporated into the AQI index (i.e., 300 – 500 ug/m^3).

We can be assured that if a reading of 500 ug/m^3 is ever before us, we have a much bigger problem on our hands than discussions of air quality. The EPA AQI is heavily biased toward extreme concentration levels that are seldom likely to occur in practical affairs; the U.K. index gives much greater weight to the lower concentration levels that are known to directly impact health, as reflected by the WHO statement above.

Major differences in the scaling of the indices, as well as their associated health effects, are therefore hidden within the various color schemes that have been adopted by various countries or jurisdictions. Color has an immediate impact upon perception and communication; the reality is that most people will seldom, if ever, explore the basis of such a system as long as the message is "green" under most circumstances that they are presented with. The fact that one system acknowledges serious health effects at a concentration level of 50 – 70 ug/m^3 and that another does not do so until the concentration level is on the order of 150 – 300 ug/m^3 is certainly lost to the common citizen, especially when the scalings and color schemes chosen obscure the real risks that are present at low concentrations.

The EPA AQI system appears to have its roots in history as opposed to simplicity and directness in describing the pollution levels of the atmosphere, especially as it relates to the real-time known health effects of even short-term exposure to lower concentration PM 2.5 levels. The following statement ("Air Quality Index | World Public Library" 2016) acknowledges weaknesses in the AQI since its introduction in 1968, but the methods are nevertheless perpetuated for more than 45 years.

"While the methodology was designed to be robust, the practical application for all metropolitan areas

proved to be inconsistent due to the paucity of ambient air quality monitoring data, lack of agreement on weighting factors, and non-uniformity of air quality standards across geographical and political boundaries. Despite these issues, the publication of lists ranking metropolitan areas achieved the public policy objectives and led to the future development of improved indices and their routine application."

The system of color coding to extreme and rarified levels with the use of an averaged and biased scale versus one that directly reports the PM 2.5 concentration levels in real time is an artifact that is divorced from current observed measurements and the knowledge of the impact of fine particulates upon human health.

The reporting of PM 2.5 concentrations directly along with a more realistic assessment of impact upon human health is hardly unique to the U.K. index system. With little more than casual research, at least three other independent systems of measurement have been identified that mirror the U.K. maximum scaling levels along with the commensurate PM 2.5 counts. These include the World Health Organization, a European environmental monitoring agency, and a professional metering company index scale (World Health Organization 2013, 10) ("Air Quality Now – About US – Indices Definition" 2016) ("HHTP21 Air Quality Meter, User Manual, Omega Engineering" 2016, 10).
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As another example to gain perspective between extremes and maximum "safe" levels of PM 2.5 concentrations, we can recall an event that occurred in Beijing, China during November 2010, and that was reported by the New York Times in January of 2013 (Wong 2013) . During this extreme situation, the U.S. Embassy monitoring equipment registered a PM 2.5 reading of 755, and the story certainly made news as the levels blew out any scale imaginable, including those that set maximums at 500.

An after statement within the article that references the World Health Organization standards may be the lasting impression that we should carry forward from the horrendous event, where it is stated that:

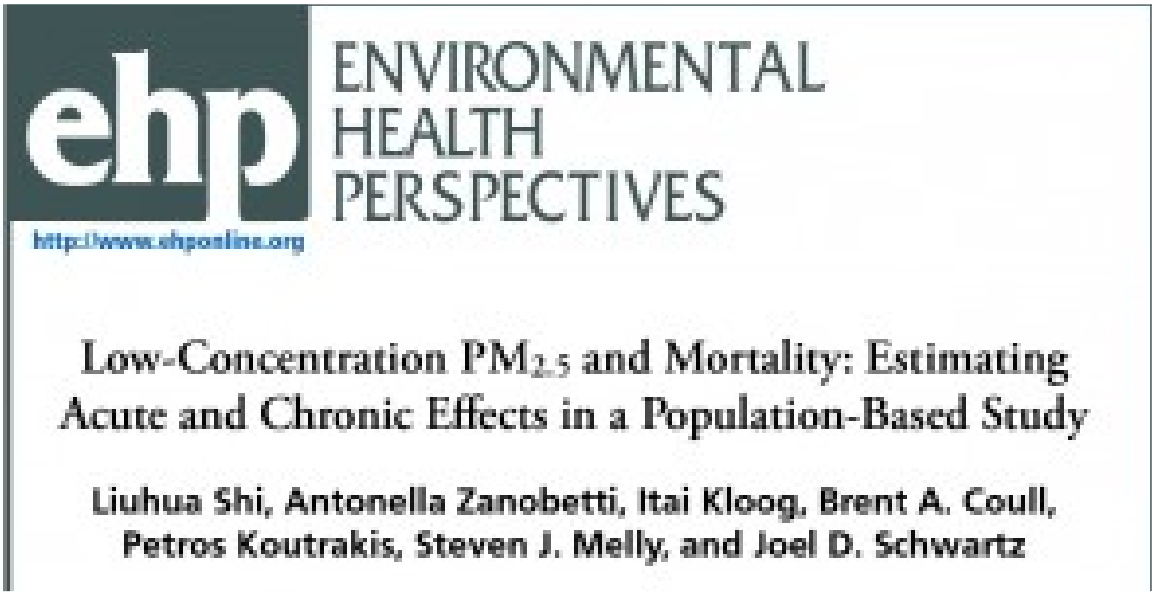
"The World Health Organization has standards that judge a score above 500 to be more than 20 times the level of particulate matter in the air deemed safe."

Not withstanding the fact that WHO also states that no there is no evidence of any truly "safe" level of particulate matter in the atmosphere, we can nevertheless back out of this statement that a maximum "safe" level for the PM 2.5 count, as assessed by WHO, is approximately 25 ug / m^3. This statement alone should convince us that we must pay close attention to the **lower** levels of pollution that enter into the atmosphere, and that public perception should not be distorted by scales and color schemes that usually only affect public perception when they number into the hundreds.

Let us gain a further understanding of how low concentration levels and small changes affect human health and, shall I daresay, **mortality**. The case for low PM 2.5 concentrations being seriously detrimental to human health is strong and easy to make. Casual research on the subject will uncover a host of research papers that quantify increased mortality rates with direct relationship to small changes in PM 2.5 concentrations, usually expressing a change in mortality per 10 ug / m^3. Such papers are not operating in the arena of scores to hundreds of micrograms per cubic meter, but on the order of **TEN** micrograms per cubic meter. This work underscores the need to update the air quality standards, methods and reporting to the public based upon current health knowledge, instead of continuing a system of artifacts based upon decades old postulations.

These papers will refer to both daily mortality levels as well as long term mortality based upon these "small" increases in PM 2.5 concentrations. **The numbers are significant** from a public health

perspective. As a representative article, consider the following recent published paper in Environmental Health Perspectives in June of 2015, under the auspices of the National Institute of Environmental Health Sciences(Shi et al. 2015) :



with the following conclusions:

Results: $PM_{2.5}$ was associated with increased mortality. In the cohort, 2.14% (95% CI: 1.38, 2.89%) and 7.52% (95% CI: 1.95, 13.40%) increases were estimated for each 10 $\mu g/m^3$ increase in short- (2 day) and long-term (1 year) exposures, respectively. The associations still held for analyses restricted to low-concentration $PM_{2.5}$ exposures. The corresponding estimates were 2.14% (95% CI: 1.34, 2.95%) and 9.28% (95% CI: 0.76, 18.52%). Penalized spline models of long-term exposure indicated a higher slope for mortality in association with exposures above versus below 6 $\mu g/m^3$. In contrast, the association between short-term exposure and mortality appeared to be linear across the entire exposure distribution.

as based upon the following results:

Table 2. Percent increase in mortality (95% CI) for a 10 μg/m^3 increase for both short-term and long-term $PM_{2.5}$.

$PM_{2.5}$ exposure	Model	Percent increase	*p*-value
With mutual adjustment			
Short term $PM_{2.5}$	Low daily exposure[a]	2.14 ± 0.81	<.001
	Full cohort	2.14 ± 0.75	<.001
Long term $PM_{2.5}$	Low chronic exposure[b]	9.28 ± 8.88	0.032
	Full cohort	7.52 ± 5.73	0.007
Without mutual adjustment			
Short term $PM_{2.5}$	Low daily exposure[a]	2.07 ± 0.80	<.001
	Full cohort	2.08 ± 0.76	<.001
Long term $PM_{2.5}$	Low chronic exposure[b]	7.16 ± 8.75	0.109
	Full cohort	6.46 ± 5.69	0.026

[a]The analysis was restricted only to person time with daily $PM_{2.5}$ less than 30 μg/m^3 (422,637 deaths).

[b]The analysis was restricted only to person time with chronic $PM_{2.5}$ less than 10 μg/m^3 (268,050 deaths).

The full cohort analysis had 551,024 deaths.

Let us therefore assume a more conservative increase of 2% mortality for a **short-term** exposure (i.e., 2 day) per **TEN** (not 12, not 100, not 500 per AQI scaling) micrograms per cubic meter. Let us assume a mortality increase of 7% for long term exposure (i.e, 365 days).

Let us put these results into further perspective. A sensible question to ask is, given a certain level of fine particulate pollution introduced into the air for a certain number of days within the year, how many people would die as a consequence of this change in our environment? We must understand that the physical nature of the particulates is being ignored here (e.g., toxicity, solubility, etc.) other than that of the size being less than 2.5 microns.

The data results suggest a logarithmic form of influence, i.e. a relatively large effect for short term exposures, and a subsequently more gradual impact for long term exposure. A linear model is the simplest approach, but it also is likely to be too modest in modeling the mortality impact. For the purpose of this inquiry, a combined linear-log approach will be taken as a reasonably conservative approach.

The model developed, therefore, is of the form:

Mortality % Increase (per 10ug/m^3) = 1.65 +. 007(days) + 0.48 * ln(days)

The next step is to choose the activity level and time period for which we wish to model the mortality increase. Although any scenario within the data range could be chosen, a reasonably conservative approach will also be adopted here. The scenario chosen will be to introduce 30 ug/m^3 of fine particulate matter into the air for 10% of the days within a year.

The model will therefore estimate a 3.6% increase in mortality for 10 ug/ m^3 of introduced PM 2.5 materials (36.5 days). For 30 ug/m^3, we will therefore have a a 10.9% increase in mortality. As we can see, the numbers can quickly become significant, even with relatively low or modest PM 2.5 increases in pollution.

Next we transform this percentage into real numbers. During the year of 2013, the Centers for Disease Control (CDC) reports that 2,596,993 people died during that year from all causes combined

("FastStats" 2016). The percentage of 10.9% increase applied to this number results in 283, 072 additional projected deaths per year.

Continuing to place this number into perspective, this number exceeds the number of deaths that result from stroke, Alzheimer's, and influenza and pneumonia combined (i.e, 5th, 6th, and 8th leading causes of death) during that same year. The number is also much higher than the death toll for Chronic Pulmonary Obstructive Disease (COPD), which is now curiously the third leading cause of death.

We should now understand that PM 2.5 pollution levels are a very real concern with respect to public health, even at relatively modest levels. Some individuals might argue that such a scenario could never occur, as the EPA has diminished the PM 2.5 standard on an annual basis down to 12 ug/m^3. The enforcement and sensitivity of that measurement standard is another discussion that will be reserved for a later date. Suffice it to say that the scenario chosen here is not unduly unrealistic here for consideration, and that it is in the public's interest to engage themselves in this discussion and examination.

The next issue of interest to discuss is that of a comparison between different air quality scales in some detail. In particular, the "weighting", or influence, of lower concentration levels vs. higher concentration levels will be examined. This topic is important because it affects the interpretation by the public of the state of air quality, and it is essential that the impacts upon human health are represented equitably and with forthrightness.

The explanation of this topic will be considerably more detailed and complex than the former issues of "color coding" and mortality potentials, but it is no less important. The results are at the heart of the perception of the quality of the air by the public and its subsequent impact upon human health.

To compare different scales of air quality that have been developed; we must first equate them. For example, if one scale ranges from 1 to 6, and another from 0 to 10, we must "map", or transform them such that the scales are of equivalent range. Another need in the evaluation of any scale is to look at the distribution of concentration levels within that same scale, and to compare this on an equal footing as well. Let us get started with an important comparison between the EPA AQI and alternative scales that deserve equal consideration in the representation of air quality.

Here is the structure of the EPA AQI in more detail (U.S. Environmental Protection Agency 2012, 4) .

AQI Index	**AQI Abitrary Numeric**	**AQI Rank**	**PM 2.5 (ug/m^3) 24 hr avg.**
Good	0-50	1	0-12
Moderate	51-100	2	12.1-35.4
Unhealthy for Sensitive Groups	101-150	3	35.5-55.4
Unhealthy	151-200	4	55.5-150.4
Very Unhealthy	201-300	5	150.5-250.4
Hazardous	301-500	6	250.5-500

Now let us become familiar with three alternative scaling and health assessment scales that are readily

available and that acknowledge the impact of lower PM 2.5 concentrations to human health:

United Kingdom Index	U.K. Nomenclature	PM 2.5 ug/m3 24 hr avg.
1	Low	0-11
2	Low	12-23
3	Low	24-35
4	Moderate	36-41
5	Moderate	41-47
6	Moderate	48-53
7	High	54-58
8	High	59-64
9	High	65-70
10	Very High	>=71

Now for a second alternative air quality scale, this being from Air Quality Now, a European monitoring entity:

Air Quality Now EU Rank	Nomenclature	PM 2.5 Hr	PM 2.5 24 Hrs.
1	Very Low	0-15	0-10
2	Low	15-30	10-20
3	Medium	30-55	20-30
4	High	55-110	30-60
5	Very High	>110	>60

And lastly, the scale from a professional air quality meter manufacturer:

Professional Meter Index	Nomenclature	PM 2.5 ug/m^3 Real Time Concentration
0	Very Good	0-7
1	Good	8-12
2	Moderate	13-20
3	Moderate	21-31
4	Moderate	32-46
5	Poor	47-50
6	Poor	52-71
7	Poor	72-79
8	Poor	73-89
9	Very Poor	>90

We can see that the only true common denominator between all scaling systems is the PM 2.5 concentration. Even with the acceptance of that reference, there remains the issue of “averaging” a value, or acquiring maximum or real time values. Setting aside the issue of time weighting as a separate discussion, the most practical means to equate the scaling system is to do what is mentioned earlier:

First, equate the scales to a common index range (in this case, the EPA AQI range of 1 to 6 will be adopted). Second, inspect the PM 2.5 concentrations from the standpoint of distribution, i.e., evaluate these indices as a function of PM 2.5 concentrations. The results of this comparison follow below, accepting the midpoint of each PM 2.5 concentration band as the reference point:

PM 2.5 (ug/m^3)	EPA AQI	UK	EU (1hr)	Meter
1-10	1	1	1	1
10-20	2	1.6	1	2.1
20-30	2	2.1	2.2	2.7
30-40	2	2.1	3.5	3.2
40-50	3	3.2	3.5	3.2
50-60	3	4.3	3.5	4.3
60-80	4	5.4	4.8	4.9
80-100	4	6	4.8	6
100-150	4	6	6	6
150-200	4	6	6	6
200-250	5	6	6	6
250-300	5	6	6	6
300-400	6	6	6	6
400-500	6	6	6	6

This table reveals the essence of the problem; the skew of the EPA AQI index toward high concentrations that diminishes awareness of the health impacts from lower concentrations can be seen within the tabulation.

This same conclusion will be demonstrated graphically at a later point.

Now that all air quality scales are referenced to a common standard, i.e., the PM 2.5 concentration), the general nature of each series can be examined via a regression analysis. It will be found that a logistical function is a favored functional form in this case and the results of that analysis are as follows:

EPA Index (1-6) = 5.57 / (1 + 2.30 * exp(-.016 * PM 2.5))
Mean Square Error = 0.27

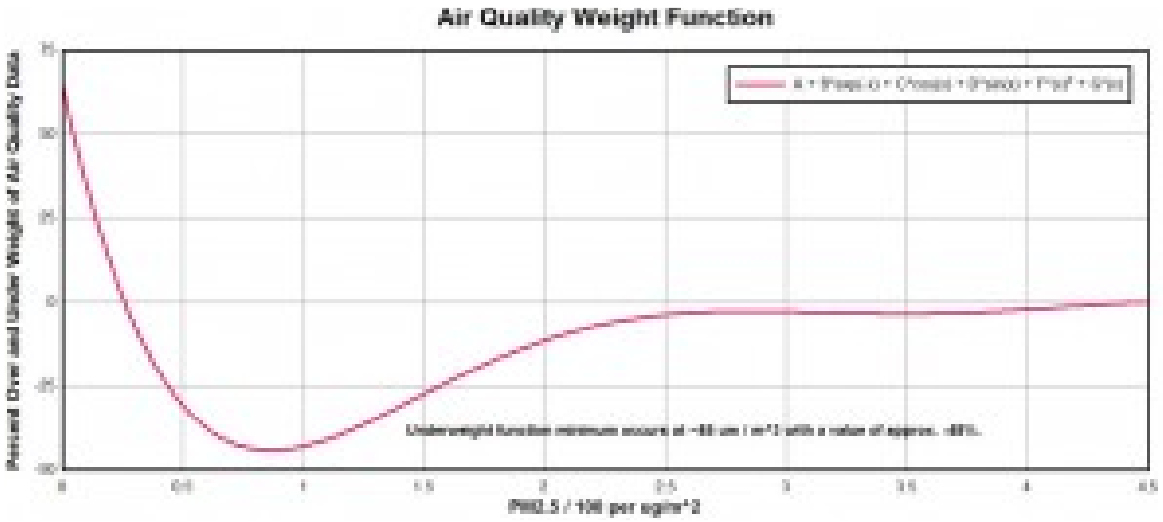
Mean (UK – EU – Meter) Index (1-6) = 6.03 / (1 + 5.65 * exp(-.046 * PM 2.5))
Mean Square Error = 0.01

The information that will now be of value to evaluate the weighting distribution applied to various concentration levels is that of integration of the logistical regression curves as a function of bandwidth. The result of the integration process (Int.) applied to the above regressions is as follows:

PM 2.5 Band	EPA AQI (Int.) [Index * PM 2.5]	Mean Index (Int.) (UK-EU-Meter) [Index * PM 2.5]	% Relative Overweight or Underweight of PM 2.5 Band Contribution Between EPA AQI and Mean

			Alternative Air Quality Index Scale (Endpoint Bias Removed)
1-10	16.1	10.1	+42%
10-20	19.8	15.8	+27%
20-30	21.9	21.6	+8%
30-40	24.1	28.3	-10%
40-50	26.3	35.2	-27%
50-60	28.5	41.5	-39%
60-80	63.6	98.0	-47%
80-100	72.1	110.4	-46%
100-150	211.7	295.0	-32%
150-200	243.7	300.8	-16%
200-250	261.7	301.4	-8%
250-300	270.7	301.5	-4%
300-400	551.8	603.0	-2%
400-500	555.9	603.0	0%

A graph of a regression curve to the % Relative Overweight/Underweight data in the final column of the table above is as follows (band interval midpoints selected; standard error = 4.1%).



And, thus, we are led to another interpretation regarding the demerits of the EPA AQI. The EPA AQI scaling system unjustifiably under-weights the harmful effects of PM 2.5 concentrations that are most likely to occur in real world, real time, daily circumstances. The scale over-weights the impacts of extremely low concentrations that have little to no impact upon human health. And lastly, when the PM 2.5 concentrations are at catastrophic levels and the viability of life itself is threatened, all monitoring sources, including the EPA, are in agreement that we have a serious situation. One must seriously question the public service value under such distorted and disproportionate representation of this important monitor of human health, the PM 2.5 concentration.

Let us proceed to an additional serious flaw in the EPA air quality standards, and this is the issue of averaging the data. It will be noticed that the current standard for EPA PM 2.5 air quality is 12 ug/m^3 ,

as averaged over a 24 hour period. On the surface, this value appears to be reasonably sound, cautious and protective of human health. A significant problem, however, occurs when we understand that the value is averaged over a period of time, and is not reflective of real-time dynamic conditions that involve “short-term” exposures.

To begin to understand the nature of the problem, let us present two different scenarios:

Scenario One:

In the first scenario, the PM 2.5 count in the environment is perfectly even and smooth, let us say at 10 ug/m^3. This is comfortably within the EPA air quality standard “maximum” per a 24 hour period, and all appears well and good.

Scenario Two:

In this scenario, the PM 2.5 count is 6 ug/m^3 for 23 hours out of 24 hours a day. For one hour per day, however, the PM 2.5 count rises to 100 ug/m^3, and then settles down back to 6 ug/m^3 in the following hour.

Instinctively, most of us will realize that the second scenario poses a significant health risk, as we understand that maximum values may be as important (*or even more important*) than an average value. One could equate this to a dosage of radiation, for example, where a short term exposure could produce a lethal result, but an average value over a sufficiently long time period might persuade us that everything is fine.

And this, therefore, poses the problem that is before us.

In the first scenario, the weighted average PM 2.5 count over a 24 hour period is 10 ug/ m^3.

In the second scenario, the weighted average PM 2.5 count over a 24 hour period is 10 ug/m^3.

Both scenario averages are within the current EPA air quality maximum pollution standards.

Clearly, this method has the potential for disguising significant threats to human health if “short-term” exposures occur on any regular basis. ***Observation and measurement will show that they do***.

Now that we have seen some of the weaknesses of the averaging methods, let us look at an additional scenario based upon more realistic data, but that continues to show a measurable influence upon human health. The scenario selected has a basis in recent and independently monitored PM 2.5 data.

The situation in this case is as follows:

This model scenario will postulate that the following conditions are occurring for approximately 10% of the days in a year. For that period, let us assume that for 13.5 hours of the day that the PM 2.5 count is essentially nil at 2 ug/m^3. For the remaining 10.5 hours of the day during that same 10% of the year, let us assume the average PM 2.5 count is 20 ug/m^3. The range of the PM 2.5 count during the 10.5 hour period is from 2 to 60 ug/m^3, but the average of 20 ug/m^3 (representing a significant increase) will be the value required for the analysis. For the remainder of the year very clean air will be assumed at a level of 2 ug/m^3 for all hours of the day.

A more extended discussion of the nature of this data is anticipated at a later date, but suffice it to say that the energy of sunlight is the primary driver for the difference in the PM 2.5 levels throughout the day.

The next step in the problem is to determine the number of full days that correspond to the concentration level of 20 ug/m^3, and also to provide for the fact that the elevated levels will be presumed to exist for only 10% of the year. The value that results is:

0.10 * (365 days) * (10.5 hrs / 24 hrs) = 16 full days of 20 ug/m^3 concentration level.

As a reference point, we can now estimate the increase in mortality that will result for an arbitrary 10 ug/m^3 (based upon the relationship derived earlier):

Mortality % Increase (per 10ug/m^3) = 1.65 +. 007(16 days) + 0.48 * ln(16 days)

and

Mortality % Increase (per 10ug/m^3) = 3.1%

The increase in this case is 18 ug/m^3 (20 ug/m^2 – 2 ug/m^3), however, and the mortality increase to be expected is therefore:

Mortality % Increase (per 18ug/m^3 increase) = 1.8 * 3.1% = 5.6%.

Once again, to place this number into perspective, we translate this percentage into projected deaths (as based upon CDC data, 2013):

.056 * (2, 596, 993) = 145, 431 projected additional deaths.

This value is essentially equivalent (again, curiously) to the third leading cause of death, namely Chronic Pulmonary Obstructive Disease (COPD), with a reported value of deaths for 2013 of 149, 205.

It is understood that a variety of factors will ultimately lead to mortality rates, however, this value may help to put the significance of "lower" or "short-term" exposures to PM 2.5 pollution into perspective.

It should also be recalled that the averaging of PM 2.5 data over a 24 hour period can significantly mask the influences of such "short-term" exposures.

A remaining issue of concern with respect to AQI deficiencies is its accuracy in reflecting real world conditions in a real-time sense. The weakness in averaging data has already been discussed to some extent, but the issue in this case is of a more practical nature. Independent monitoring of PM 2.5 data over a reasonably broad geographic area has produced direct visible and measurable conflicts in the reported state of air quality by the EPA.

After close to twenty years of public research and investigation, there is no rational denial that the citizenry is subject to intensive aerosol operations on a regular and frequent basis. These operations are conducted without the consent of that same public. The resulting contamination and pollution of the atmosphere is harmful to human health. The objective here is to simply document the changes in air quality that result from such a typical operation, and the corresponding public reporting of air quality by the EPA for that same time and location.

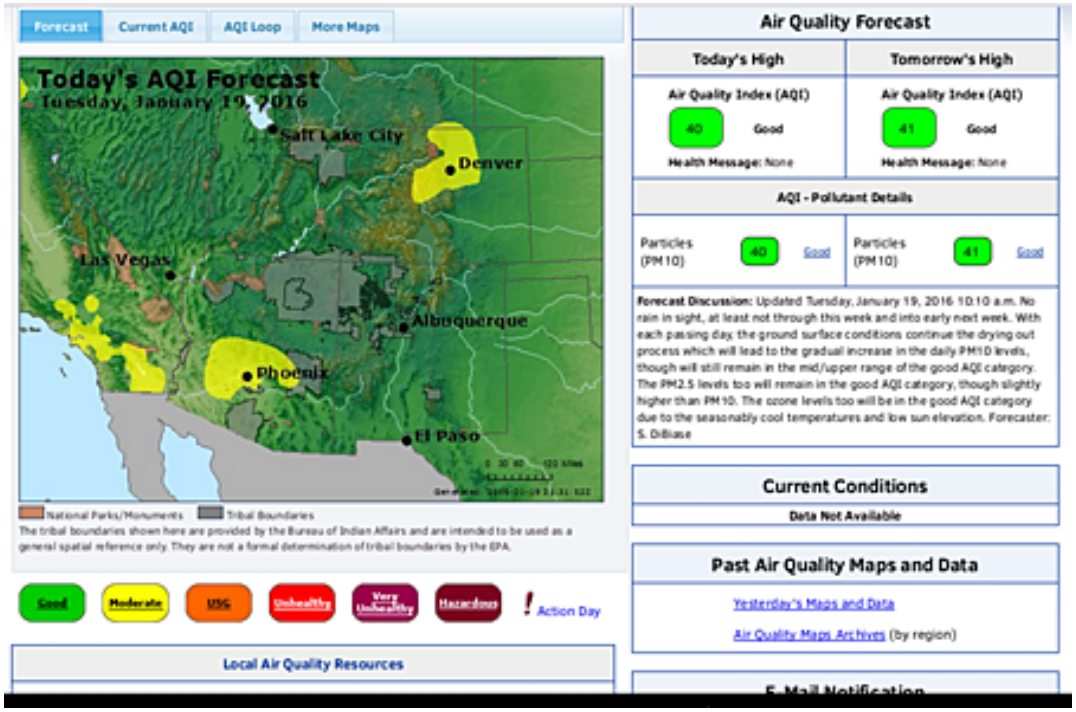
Multiple occasions of this activity are certainly open to further examination, but a representative case will be presented here in order to disclose the concern.

Typical Conditions for Non- Operational Day.
Sonoran National Monument – Stanfield AZ

Aerosol Operation – Early Hours
Jan 19 2016 – Sonoran National Monument – Stanfield AZ

Aerosol Operation – Mid-Day Hours

Jan 19 2016 – Sonoran National Monument – Stanfield AZ



EPA Website Report at Location and Time of Aerosol Operation.
Jan 19 2016 – Sonoran National Monument – Stanfield AZ
Air Quality Index : Good
Forecast Air Quality Index : Good
Health Message : None
Current Conditions : Not Available
("AirNow" 2016)

The PM 2.5 measurements that correlate with the above photographs are as follows:

With respect to the non-operational day photograph, clean air can and does exist at times in this country, especially in the more remote portions of the southwestern U.S. under investigation. It is quite typical to have PM 2.5 counts from 2 to 5 ug/m^3, which fall under the category of very good air quality by any index used. Low PM 2.5 counts are especially prone to occur after periods of heavier rain, as the materials are purged from the atmosphere. The El Nino influence has been especially influential in this regard during the earlier portion of this winter season. Visibility conditions of the air are a direct reflection of the PM 2.5 count.

On the day of the aerosol operation, the PM 2.5 counts were not low and the visibility down to ground level was highly diminished. The range of values throughout the day were from 2 to 57, with the low value occurring prior to sunrise and post sundown. The highest value of 57 occurred during mid-afternoon. A PM 2.5 value of 57 ug/m^3 is considered poor air quality by many alternative and contemporary air quality standards, and the prior discussions on mortality rates for "lower" concentrations should be consulted above. This high value has no corollary, thus far, during non-aerosol-operational days. From a common sense point of view, the conditions recorded by both photograph and measurement were indeed unhealthy. Visibility was diminished from a typical 70 miles + in the region to a level of approximately 30 miles during the operational period. Please refer to the earlier papers

(*Visibility Standards Changed,* March 2001 and *Mortality vs. Visibility*, June 2004; *also additional papers*) for additional discussions related to these topics.

The U.S. Environmental Protection Agency reports no concerns, no immediate impact, nor any potential impact to health or the environment during the aerosol operation at the nearest reporting location.

Summary:

This paper has reviewed several factors that affect the interpretation of the Air Quality Index (AQI) as it has been developed and is used by the U.S. Environmental Protection Agency (EPA). In the process, several shortcomings have been identified:

1. The use of a color scheme strongly affects the perception of the index by the public. The colors used in the AQI are not consistent with what is now known about the impact of fine particulate matter (PM 2.5) to human health. The World Health Organization (WHO) acknowledges that there are NO known safe levels of fine particulate matter, and the literature also acknowledges the serious impact of low concentration levels of PM 2.5, including increased mortality.

2. The scaling range adopted by the AQI is much too large to adequately reveal the impact of the lower concentration levels of PM 2.5 to human health. A range of 500 ug/m^3 attached to the scale when mortality studies acknowledge significant impact at a level of 10 ug/m^3 is out of step with current needs by the public.

3. The underweighting of the lower PM 2.5 concentration levels relative to more contemporary scales that adequately emphasize lower level health impacts obscures health impacts which deserve more prominent exposure.

4. The AQI numeric scale is divorced from actual PM 2.5 concentration levels. The arbitrary scaling has no direct relationship to existing and actual concentrations of mass to volume ratios. The actual conditions of pollution are therefore hidden by an arbitrary construct that obscures the impact of pollution to human health.

5. The AQI is a historic development that has been maintained in various incarnations and modifications since its origin more than 45 years ago. The method of presentation and computation is obtuse and appears to exist as a legacy to the past rather than directly portraying pollution health risks.

6. The averaging of pollution data over a time period that filters out short term exposures of high magnitude is unnecessary and it hinders the awareness of the actual conditions of exposure to the public.

7. Presentation of air quality information through the authorized portal appears to present potential conflicts between reported information and actual field condition observation, data and measurement.

Recommendations:

In the opinion of this researcher the AQI, as it exists, should be revamped or discarded. Allowing for catastrophic pollution in the development of the scale is commendable, but not if it interferes with the presentation of useful and valuable information to the public on a practical and daily basis.

There is a partial analogy here with the scales used to report earthquakes and other natural events, as they are of an exponential nature and they provide for extreme events when they occur. It is now known, however, that very low levels of fine particulate matter are very harmful to human health. Any scaling chosen to represent the state of pollution in the atmosphere must correspondingly emphasize and reveal this fact. This is what matters on a daily basis in the practical affairs of living; the extreme events are known to occur but they should not receive equal (or even greater) emphasis in a daily pollution reporting standard. It is primarily a question of communicating to the public directly in real-time with actual data, versus the adherence to decades old legacies and methods that do not accurately portray modern pollution and its sources.

It seems to me that a solution to the problem is fairly straightforward; this issue is whether or not such a transformation can be made on a national level and whether or not it has strong public support. Many other scaling systems have already made the switch to emphasize the impact of lower level concentrations to human health; this would seem to be admirable based upon the actual needs of society.

It is a fairly simple matter to reconstruct the scale for an air quality index. THE SIMPLEST SOLUTION IS TO REPORT THE CONCENTRATION LEVELS DIRECTLY, IN REAL TIME MODE. For example, if the PM 2.5 pollution level at a particular location is, for example, 20 ug/m^3, then report it as such. This is not hard to do and technology is fully supportive of this direct change and access to data. We do not average our rain when it rains, we do not average our sunlight when we report how clear the sky is, we do not average the cloud cover, and we do not average how far we can see. The environmental conditions exist as they are, and they should be reported as such. There is no need to manipulate or “transform” the data, as is being done now. A linear scale can also be matched fairly well to the majority of daily life needs, and the extreme ranges can also be accommodated without any severe distortion of the system. The relationship between visibility and PM 2.5 counts will be very quickly and readily assimilated by the public when the actual data is simply available in real-time mode as it needs to be and should be. Of course, greater awareness of the public of the actual conditions of pollution may also lead to a stronger investigation of their source and nature; this may or may not be as welcome in our modern society. I hope that it will be, as the health of our generation, succeeding generations, and of the planet itself is dependent upon our willingness to confront the truths of our own existence.

Clifford E Carnicom
Mar 12, 2016

Born Clifford Bruce Stewart
Jan 19, 1953

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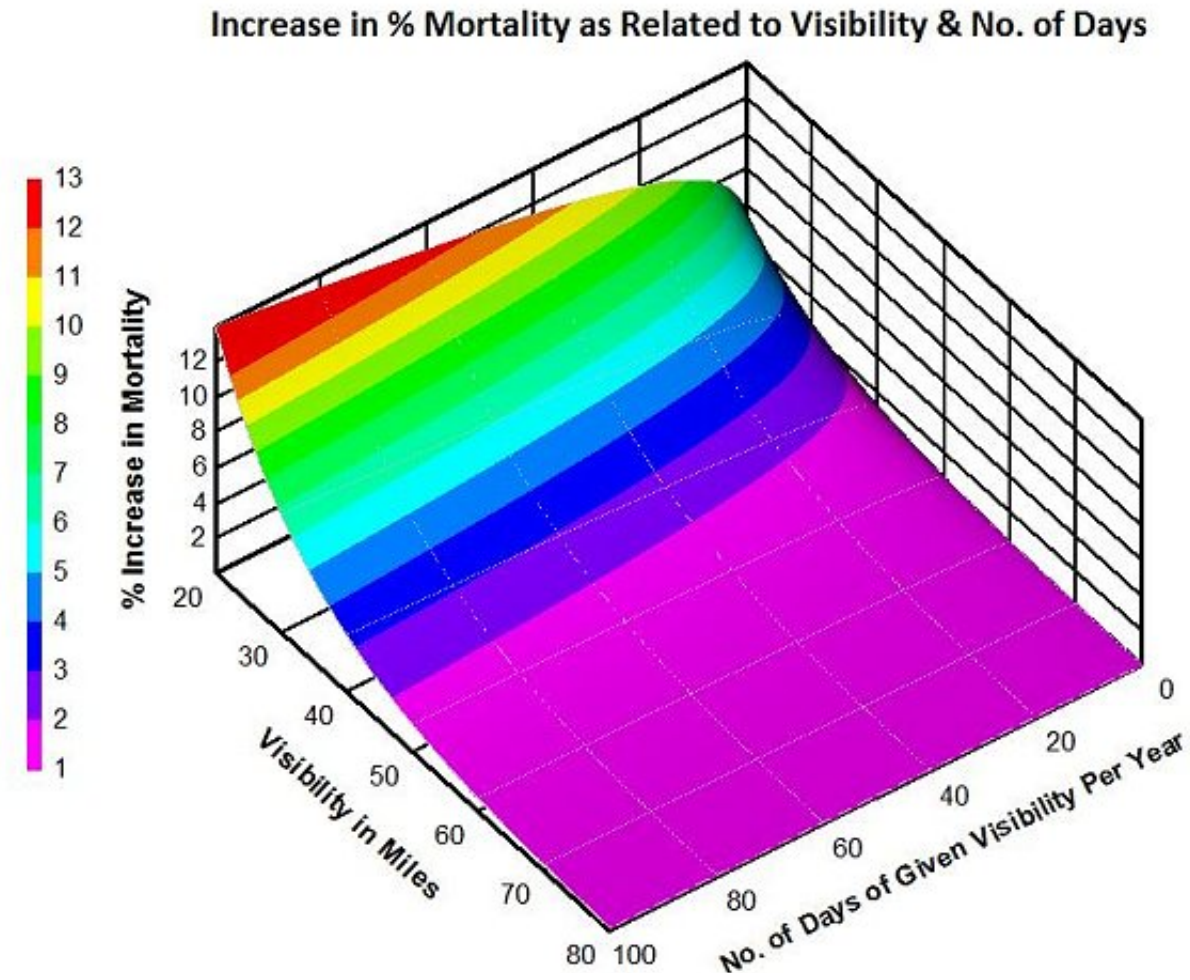
Mar
Pollution, Visibility and Mortality
Mar 5, 2016

Pollution, Visibility and Mortality
by
Clifford E Carnicom
Mar 12 2016

A preliminary empirical model has been developed to estimate the impact of diminished visibility and fine particulate pollution upon mortality rates. The model is a synthesis between an analysis of measured pollution levels (PM 2.5), observed visibility levels and published increased mortality estimates. The model is based, in part, upon previous investigations as published in the paper "*The Obscuration of Health Hazards : An Analysis of EPA Air Quality Standards*", Mar 2016.



Preliminary Visibility -Exposure – Mortality Model

Air pollution has many consequences. One of the simplest of these consequences to understand is that of mortality and the degradation of health. It would be prudent for each of us to be aware of the sources of pollution in the atmosphere, and their subsequent effects upon our well being. Measurement, monitoring and auditing of airborne pollution is within range of the general public, and the role of the

citizens to participate in these actions is of increased imperative. The role of public service agencies to act on behalf of public health needs and interests has not been fulfilled and we must all understand and react to the consequences of that neglect.

This particular model places the emphasis upon what can be directly observed with no special means, and that is the visibility of the surrounding sky. Visibility levels are a direct reflection of the particulate matter that is in the atmosphere, and relations between what can be seen (or not seen, for that matter) and the concentration of pollution in the atmosphere can be established. The relationships are observable, verifiable and are well known for their impacts upon human health, including that of mortality.

All models are idealized representations of reality. Regardless of variations in the modeling process, it can be confidently asserted that there are direct physical relationships between particulate matter in the atmosphere, the state of visibility, and your health. There are, of course, many other relationships of supreme importance, but the objective of this article is a simple one. It is : to look, to be aware of your surroundings, to think, to act, and to participate. The luxuries and damage from perpetual ignorance can not be dismissed or excused.

The call for awareness is a fairly simple one here. I encourage you to become engaged; if for nothing else than the sake of your own health. When this has been achieved, you are in a position of strength to help others and to improve our world. This generation has no right or privilege to deny the depths of nature to those that will follow us.

Models are one thing, real life is another. It is time to assume your place.

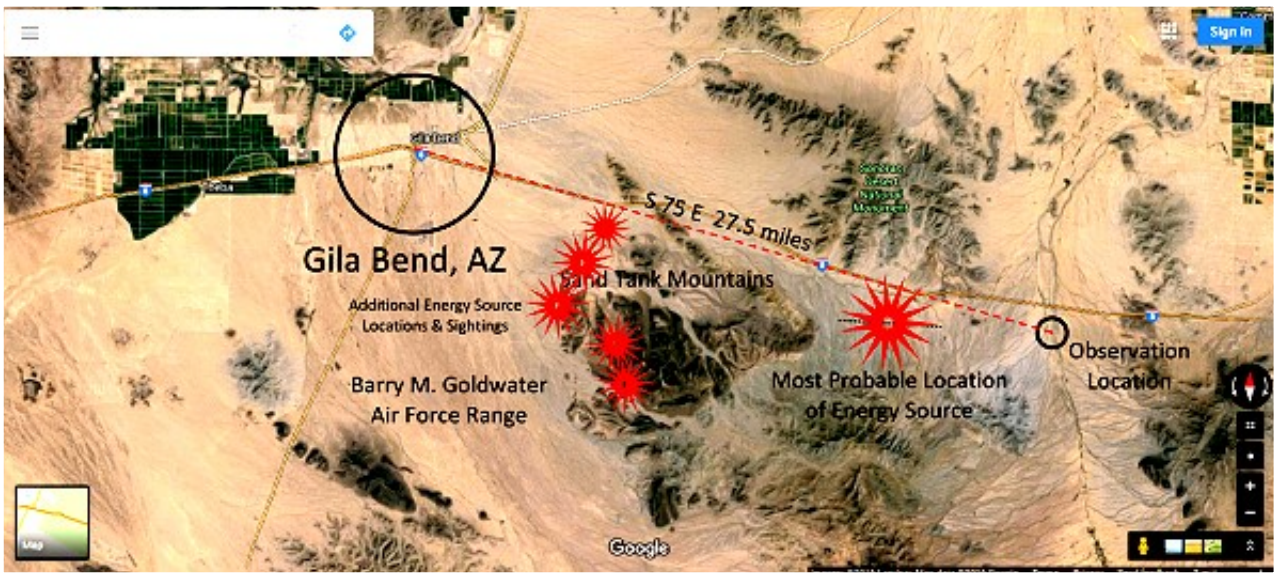
Sincerely,

Clifford E Carnicom
Mar 12, 2016

Exotic Technology Witnessed
Mar 15, 2016

Exotic Technology Witnessed

(a casual paper)
by
Clifford E Carnicom
Mar 18 2016



Map of Witnessed Light-Energy Sources
Sonoran Desert National Monument, Arizona
December 27, 2015
(source : modification of google maps)

The events witnessed and recorded in this report have precedent. The general area of Gila Bend, Arizona is known to be the source of unusual “lights” in the night sky over a period of many decades; casual research and investigation will verify that fact. There are also indications that Native Americans may have witnessed similar events over periods that span hundreds of years in the past, but I have no insight to verify this as of yet. Such eyewitness accounts are difficult to record because of the conditions of observation and the remoteness of the area. The account provided here appears to be unique in the level of detail that has been captured through careful observation and favorable camera work. It is of value to provide this information to the public record in demonstration that the accounts of sighting are credible, repeatable, verifiable, and of unique dimension and character.

The essentials of location are shown in the map above. The point of observation is within the Sonoran Desert National Monument, approximately 30 miles southeast of Gila Bend, Arizona. The region is one of remoteness and lack of civilization. It is characterized by a vast expanse of desert, punctuated with several prominent mountain ranges within, including the Sand Tank Mountains as shown on the map. It is also important to note that west and southwest of the point of observation lies a significant military presence known as the Barry M. Goldwater Air Force Range. This area appears, not surprisingly, to host a series of advanced military interests, operations and technologies.


Image of Paired Lights – Energy Sources
Transformation of Internal Energy Structure Visible in Light to Right

The events shown here occurred on the night of January 27, 2016 at approximately 1930 (7:30 PM), about 45 minutes after sundown. There were two personal witnesses to all affairs described on this date, and they are each in agreement about the details that are presented. The evening skies were clear and without interruption. The camera used has a significant optical zoom (~30x) and it was able to consistently able to focus on the lights in detail because of their brilliance and size. The lights have a uniform and rich orange color, and they are quite distinctive from any common light source in the night skies, including that of aircraft. The pattern of appearance in the sky is instantaneous and without obvious or apparent motion. The lights appear sometimes singly, sometimes in unison, and sometimes in geometric formation. They appear at different altitudes, but they remain close to the horizon; in this case the light sources were never more than 5 degrees above the horizon and remained stationary during the periods of observation. The lights, after an unpredictable period of time, vanish or extinguish themselves as if a fuel or energy source (e.g., ions, plasma) was exhausted. The lights have absolutely no rational similarity to the behavior of “flares”, as has been purported by certain individuals on the fringes of reason. The light and energy sources are truly unique, and the photographs here capture at least certain portions of that uniqueness that are not to be denied. The lights frequently remain visible for a period of several minutes in stationary form, extinguish themselves, and then reappear at a different location within the same general vicinity of the sky.

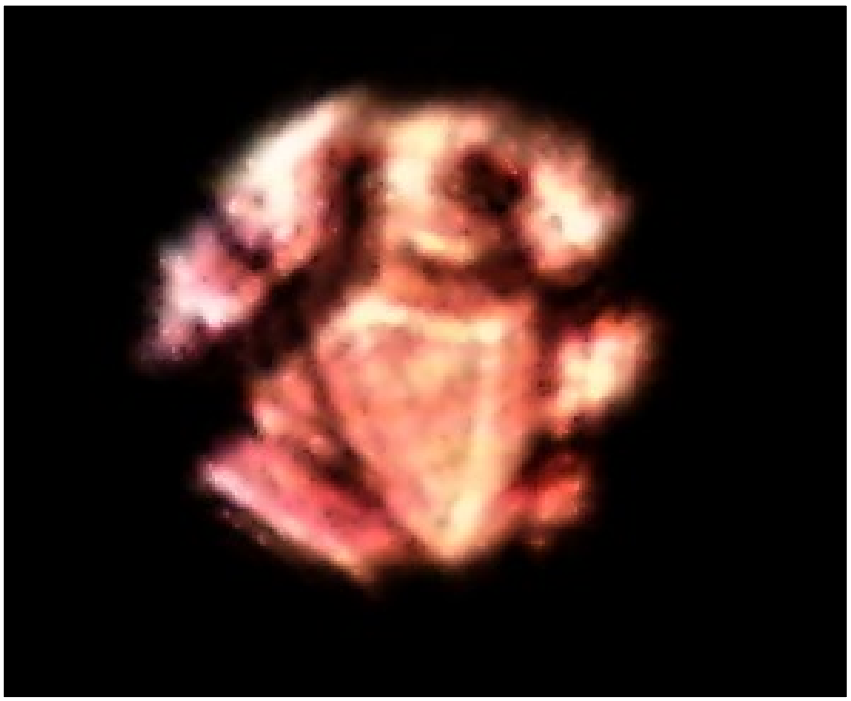

Increased Detail of Light – Energy Source
(Image on Right of Previous Photo)


Image of Paired Lights – Energy Sources
Variations in Internal Energy Structure Increasingly Apparent

The primary witness here has a strong background in the professions of surveying and photogrammetry. There is no inclination or predisposition to exaggerate any of the details of measurement or observation; all estimates originate from seeking the accuracy and error estimates that are characteristic of such work.

The primary focus of this paper is the detail captured in the energy source that occurred closest to the point of observation, as shown within the map. It is the proximity of this light source to the observer and the camera that distinguish this record. The best estimate of the distance to this particular light source is

between a range of five to ten miles. A small cinder cone three miles away on roughly the same line of site (approx. N80W) had been hiked to six days prior; this served as important reference point for distance. The Sand Tank Mountains behind the light source served equally well for reference points of both altitude and distance. The primary light sources shown here fall between these two reference points for distance.



Close Up Image of Light Light – Energy Source
Internal Structure Apparent

The primary light source shown here was both low to the ground and bright. The energy from the light was brilliant enough that ground level was partially illuminated. It was also apparent that this illumination extended equally in the opposite direction in all directions and upward into the night sky. There was certainly the sense of close proximity and direct experience within this event. It was of such immediacy that at one point the partner witness was asked what actions would be taken if it were to take shape directly overhead; there was no response to the question. Apparently captivation by the witness from the event was the priority at the moment.

The primary light source remained visible for approximately 12 – 15 minutes. It remained stationary during that entire period. The brightness during this period did vary to some degree. The light source was repeatedly photographed with success, and only a portion of that image library is presented on this paper. A maximum of five lights were seen at one time; three in linear formation and a pair of lights at a separated distance. The images shown are the unique record from this event, and it is hoped that they will inspire the further investigations that they deserve. In total, the experience from various lights, in various locations and formations, of varying intensity but always stationary upon appearance, lasted close to an hour on this evening.

There are some additional and ancillary details of this experience that bear mentioning.

The first has to do with some “additional lights” that accompany the bright energy sources that have been photographed and shown here. The best description that I can offer of these additional lights is that of “pinpoint fireworks”. These small lights repeatedly flash in random patterns in the general vicinity

of the primary lights; in this case the majority of them occurred along the horizon to the west – southwest in the apparent vicinity of the Sand Tank Mountains. These lights do not show any linear motion or pattern characteristic of aircraft; they are numerous, of random pattern, momentary, and without any linear or obvious geometric motion. These lights appear to develop and become active in proportion to the intensity and number of primary light sources visible, i.e., they were at a maximum during the time of five primary lights being simultaneously visible. The role or source of these accompanying lights to the primary lights is in no way obvious.

The secondary comment concerns the repetition of the events that are described above. These repetitions are now known to have spanned more than a month in time, and to have occurred in an additional location.

The first incidence of repetition is in regard to the “additional lights” mentioned immediately prior. On the night of December 26, 2015 I also noticed an identical light pattern of “pinpoint fireworks” on the western horizon after dark from the same vantage point as that of December 27th, 2015. There were no “primary lights” witnessed on that same night. I mentally noted the observations as being unusual, but I dismissed the significance of the observations in “deference to conservatism”. I attempted to rationally attribute the unusual momentary light pulses to that of aircraft, even though the number of lights visible would defy any rationale interpretation, even in the presence of military training grounds in the remote desert. The events of December 27 now place that experience into the broader context of an extraordinary event that was to follow on the next evening.

The next incidence of repetition occurs on the night of February 8th and 9th in a location known as Synder Hill, which lies in the fringe of the Tucson urban area, but nevertheless also under a darkened desert sky. The location is a curious blend of remoteness juxtaposed with urban sprawl and housing developments. It is a fair statement to say that the identical light patterns were observed again and it was only previous experience that confirmed their uniqueness amongst the urban impulses that dot the horizon and introduce chaos into the desert skies. The specifics of the case define this particular affair. The orange, stationary, appearing and disappearing lights appeared on the low horizon on an estimated bearing of N50W approximately 80 miles distant. It will be found that this matches the Gila Bend observation location as close as reasonable estimates will allow. It is only the previous experiences from two weeks prior that prompted the attention and details of observation. The evidence here is that the events are not singular in nature, and the history of record for the “Gila Bend lights” supports that claim.

The third and final form of repetition occurs from an entirely separate location, this time in the remote desert stretches of New Mexico. At the marvelous and unique location of City of Rocks (NW of Deming, NM) amidst the clear and dark skies of February 29, 2016, the event bears another mark. In this occasion, the event lasted no more than 30 seconds with a singular orange and stationary glow low on the horizon. The appearance and extinguishing of the light is a unique characteristic of identification, along with color and lack of motion. The details of observation here are as follows:

The estimated bearing is N70E. Estimated distance is approximately 80 miles (such estimates are not difficult with star navigation).

It will be found that this location estimate leads to another point of interest, the White Sands Space Harbor. Suffice it to say that White Sands is another region of the country that is richly steeped in military history, including the detonation of the first atomic bomb (Trinity Site) and development of the U.S. space and missile programs.

And finally, it should be mentioned that at the close of the Sonoran Desert National Monument event, the

silhouette of two fighter jets circling almost directly overhead could be seen as they turned an arc from the observation site toward the southeast, apparently in return towards Davis Monthan Air Force base in Tucson, AZ. The aircraft appeared to be of the A-10 “Warthog” model, and what was noticeably odd was the extreme quiet of the planes under the circumstances. It seemed as though the aircraft were essentially in an idle mode, as they were at fairly low altitude and yet barely audible. Not characteristic of fighter aircraft flight, it would seem. The aircraft specifications include, however, high maneuverability at low speed and low altitude (less than 1000 ft.) as well as “loitering” capability, so all does appear to be fitting under the circumstances.

Where this excursion into “exotic technology” leads is, of course, subject to speculation, intrigue and potential covert affairs where we are unlikely to learn the details that we seek. My speculation may certainly be no better than yours, and I claim no expertise in that matter. My primary motive here is to get the data on the record, let you see the photographs that have been fairly captured, and to give some specifics from the measurement point of view.

We must admit, however, that the issue is ripe for inquiry, and I will do at least some casual justice to that expectation that you may have. What we do know, with a fair degree of confidence is:

1) The “lights” are hardly *just lights*. The historic record and eyewitness accounts have, until now, only been able to justify that claim because of insufficiency in detail.

2) The lights are certainly not flares; you will have to do your own homework on that account or take a trip to Gila Bend and wait long enough to settle the question for yourself. I consider myself lucky with respect to timing for this observation, but suffice it to say I did spend a couple of weeks under that particular night sky before the camera came to life for you.

3) It certainly appears that these energy sources may favor military locations with their presence. You can play that card either way, of course, and cast your die for either military origination or “external” origination. I personally can allow for either side of the equation until I have a bit more data. A spectral signature of the energy source might be a good start, for example…

4) If we try to force a slightly conventional physical explanation into the issue, the closest that I can offer at this time would be on the likes of a “plasma” ball. Some of us may recall the attention given to the “foo fighters” of decades past. Either way, the source, means of creation, control of location, appearance, disappearance, and purpose would all have to be opening questions in the matter. Concentrated energy sources or weapon development might be another line of pursuit.

5) We know that there is internal structure and geometry to the energy source. This is probably the most remarkable characteristic as it does imply a level of intelligence in the matter. Until we can get into the innards and dissect the electrons in traditional western scientific fashion (or gain metaphysical insight from the Native Americans, as an alternative) we must remain in a state of frustrated ignorance in the matter. I do not expect a fund-raising campaign to get to the truth of the matter to be successful, but I will keep the dream alive.

6) Another tantalizing conjecture concerns the prospect that the energy source is an “external” monitoring device or system. Heaven knows that there are plenty of things to be curious about at our military facilities these days. Many years ago I was privileged to see an unusual video (I thank the individual that pulled me aside for those moments, I apologize that I can not give you proper credit) that showed evidence of such a device or system. In this case, the daylight “orb”, as it were, appeared to demonstrate the motive of sampling certain particulates that were deliberately introduced into the upper

atmosphere via aircraft; my interpretation of it being a sensor is based upon certain hesitations in motion during the path of transit. Either way, I am certainly willing to take the notion seriously enough to hope that the fund-raising campaign for truth succeeds someday.

And there you have it… another mystery for the world in the annals of scientific observation. I would hope that you will consider it "fair and balanced reporting". My job has been done in letting you know that something unusual occurred, I bear witness to it, I have provided a modicum of evidence to that effect, and you now have another problem on your hands to solve. I will keep working on it myself.

Best regards,

from

Clifford E Carnicom
March 18, 2016

ADDENDUM: additional info provided by a reader, YouTube video at bottom.

Greetings Clifford,

As a concerned member of and for humanity, I often study up on the LIE being perpetuated against us – chemtrails, UFOs, Hybrids, DUMBs, etc.. My reading has lead me to your excellent website and article (https://carnicominstitute.org/wp/exotic-technology-witnessed/) after finding a YouTube video on the Geo/Bio engineering through aerial spraying, which is extremely prevalent where I live, near San Francisco.

After browsing your website, I immediately noticing something familiar in the exotic technology article. I have seen those lights before, from 30,000 feet aboard United Flight 380 from IAH to SFO, at 10:59 PM on February 11, 2016, the flight path of which is pictured in the attached JPG and well north of where your sighting took place. The photos on your website are precisely what I viewed.

My account of the sighting is as follows:

I had been asleep for about an hour or so when at 10:58 PM, I had a strong mental sensation to wake up and look out of my starboard window; a sensation that I knew, even before seeing anything, that I'd see something out the window. Sure enough, the very second I put my forehead against the clear plastic and looked down, there were 5 large, brilliant balls of light in a cluster-like spread, in various degrees of size and brightness, emanating light in a fairly rapid but fluid pulsating manner, almost as if they were communicating with one another. One in particular, the largest, was the most active. It/they were so bright, that it was evident they were above the ground, perhaps anywhere from 50 to 400 feet, given they were lighting up the desert floor, causing stark, visible shadows against the surrounding mountain terrain. It was clear they were not tied to any kind of structure or pipe, as their increasing and decreasing glowing moved back and forth between each of them, the light being cast on the terrain where the others had been previously showed no silhouettes, structures, vehicles or roads at all. It was very difficult to gauge the size or diameter of them from 30,000 feet but if I had to guess, the largest may have been 200 to 400 feet and the smallest, perhaps 50 – 100 feet. Some math of the camera used, the altitude and size of the light could probably figure it out. At the very moment I began to reach for my iPhone to take a video, the largest light fluidly extinguished itself, followed immediately by the others. Two of the smaller ones appeared in a different but nearby location, pulsed lightly back and forth a few times, as if whispering to each other, and then went out for good. The shape of these lights ranged from stark, hard

circular shapes to that of what looked like organized flames within a ball-like structure, just as what you have pictured on your website.

I did manage to capture one of the smaller orbs during its final pulse of light before all went dark. I've attached a video of it here at 400% magnification, which came off an iPhone 6s video camera.

Are there any other sightings, photos or videos of these things? I'd love to find out what they are.

Keep up the great work and write-ups. Love the site.

Best Regards,

David Goedde

Exotic Technology Witnessed. Nevada Desert Lights : https://youtu.be/5IZDzVaBtiY

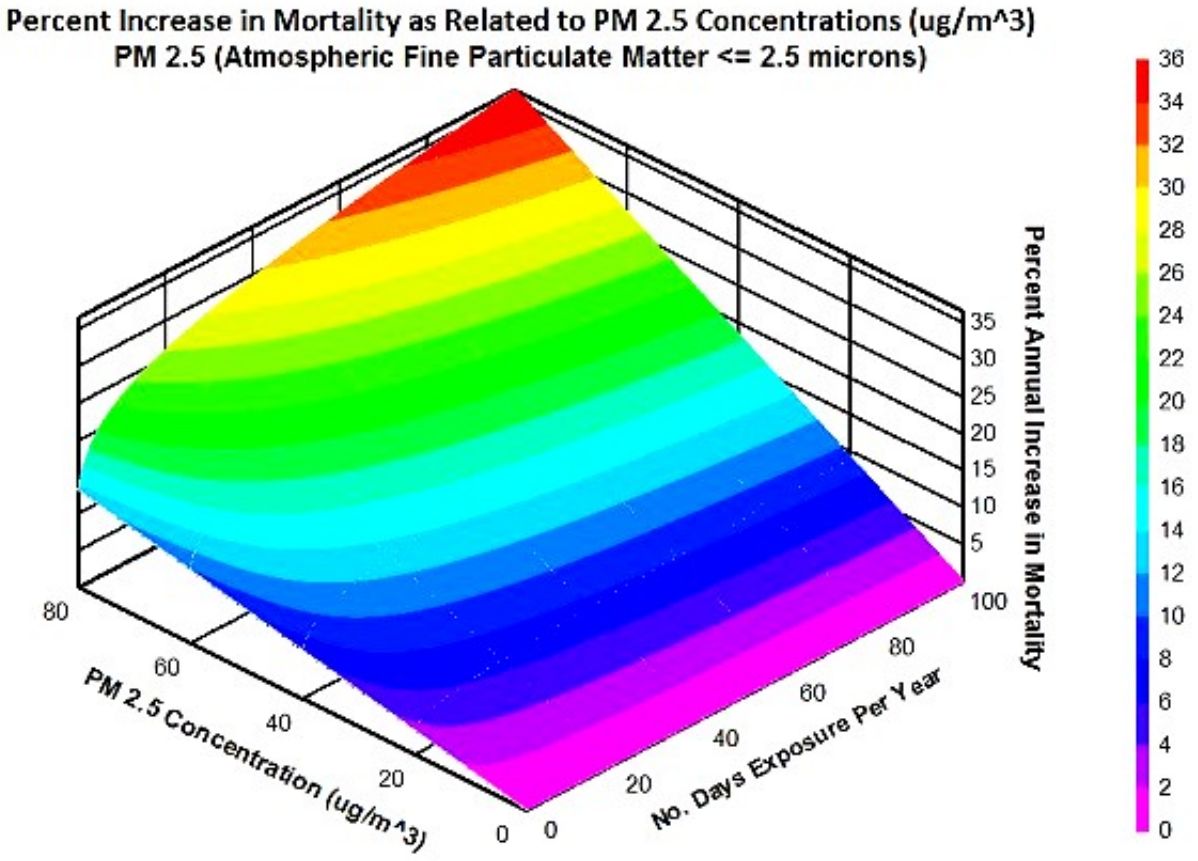
Pollution, Concentration and Mortality
Mar 19, 2016

Pollution, Concentration and Mortality

by Clifford E Carnicom
Mar 19 2016

A preliminary analytical model has been developed to estimate the impact of increased concentrations of atmospheric fine particulate pollution (PM 2.5) upon mortality rates. The model is a synthesis between an analysis of measured pollution levels (PM 2.5) and published increased mortality estimates. The model is based, in part, upon previous investigations as published in the paper "*The Obscuration of Health Hazards : An Analysis of EPA Air Quality Standards*", Mar 2016.

Models for both concentration levels and visibility have now been developed; for a related model in terms of visibility, please see the paper entitled *Pollution, Visibility and Mortality*, Mar 2016.



Preliminary Concentration -Exposure – Mortality Model

A substantial data base based upon direct field measurements of atmospheric fine particulate matter in the southwestern United States during the winter of 2015-2016 has been acquired. The measurements reveal clear relationships between the quality of air, the PM 2.5 concentration levels, visibility of the surrounding territory, and the existence or absence of airborne aerosol operations.

The field data shows that repeated instances of the PM 2.5 count in the range between 30-60 ug/m3 is

not unusual in combination with active atmospheric aerosol operations; visibility and health impacts are obvious under these conditions. The PM 2.5 count will inevitably be less than 10 (or even 5) ug/m3 under good quality air conditions.

Additional studies based upon this acquired data may be conducted in the future. Numerous published studies make known relationships between small increases in PM 2.5 pollution and increased mortality.

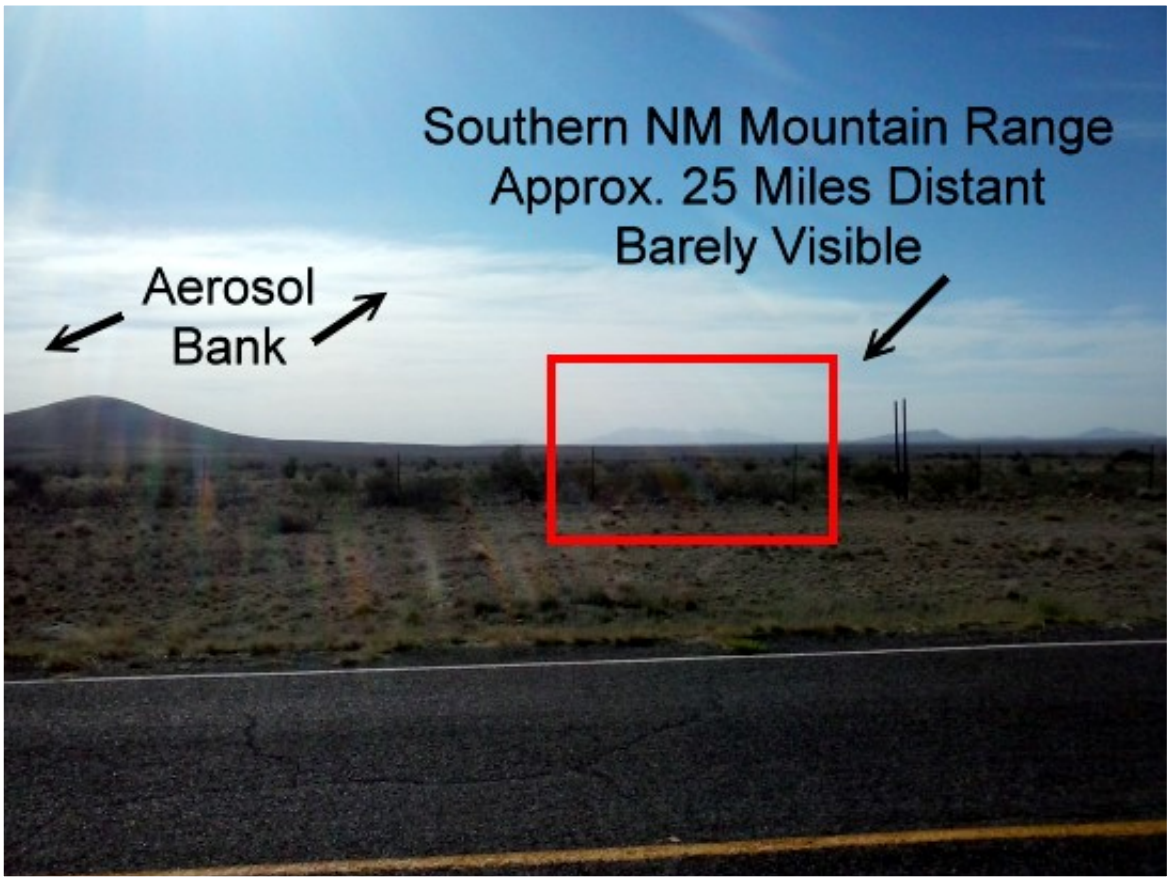
Measured PM 2.5 Count, 44 ug/m^3.

As an example of use of this model, if the PM 2.5 count is 44 ug/m^3 as shown in the above example, and if the number of days of exposure of this level is approximately 50, then the estimated increase in annual mortality is approximately 17%. This is an extreme increase in mortality, but under observed conditions in various locales it is not beyond the range of consideration. It is thought that reasonably conservative approaches have been adopted within the modeling process.

The field data that has been collected and this model further highlight the serious deficiencies in the current Air Quality Index (AQI) as in current use by the U.S. Environmental Protection Agency (EPA). In light of the current understanding of the health impacts of small changes in PM 2.5 counts (e.g, 10 ug/m^3), a scale that gives equal prominence to values as high as 500 ug/m^3 (catastrophic conditions) is an incredible disservice to the public. Please see the earlier referenced papers for a more thorough discussion of the schism between public health needs and the reporting systems that are in place.

This researcher advocates the availability of direct and real-time fine particulate matter concentration levels (PM 2.5) to the public; this information should be as readily available as current weather data is. Cost and technology are no longer major barriers to this goal.

 Active Aerosol Operation
City of Rocks, Southern N.M.



Demonstration of the Impact of Aerosol Banks Upon Visibility.
Concentration Levels and Subsequent Visibility Changes
Directly Impact Mortality.

As an incidental note, it may be recalled from earlier work that there is a strong conceptual basis for the development and application of surveillance systems that are dependent upon atmospheric aerosol concentrations. This application is only one of many that have been proposed over a period of many years, and readers may refer to additional details on this subject within the research library. Documentaries produced by this researcher (Aerosol Crimes, Cloud Cover) during the last decade also elaborate on those analyses. The principles of LIDAR apply here.

Current field observations continue to reinforce this hypothesis. Observation in the southwest U.S. indicates that two locale types appear to be preferred targets for application: these include the large urban areas and the border region between the U.S. and Mexico. These locations, considered in a joint sense, suggest that both people and the monitoring or tracking of those same people within an area may be a technical and strategic priority of the project. A citizen based systematic and sustained nationwide monitoring system of PM 2.5 concentrations over a sufficient time period can clarify this issue further.

The recent papers on the subject of air quality are intended to raise the awareness and involvement of the public with respect to environmental and health conditions. There are very real relationships between how far you can see, the concentration levels of particulates in the atmosphere, and ultimately our mortality. It is our responsibility as stewards, as well as in our own best interest, to not deliberately and wantonly contaminate the planet.

Clifford E Carnicom
Mar 19, 2016

Apr
A Clash of Evidence
Apr 6, 2016

A Clash of Evidence:
The Realities of *Solar Radiation Management* (SRM)

by Clifford E Carnicom
Apr 06 2016
Edit May 14 2016
Edit Jul 05 2016
(A Partial Editorial)

There are many environmental activists who assume a certain cause and relationship between active geoengineering programs and those projects that fall under the term of “Solar Radiation Management“ (SRM). This paper will reiterate the basic fallacy of that assumption, and it will direct the reader towards a more comprehensive inquiry of the true nature of the forces and agendas that are likely to be involved.

For those that do not wish to engage in the full length of this article, the Solar Radiation Management principle is one of interfering with solar heat transfer to the earth. There are various schemes for accomplishing this which will be discussed later; the most modest of the choices requires the introduction of certain types of particulates into the middle of the ***stratosphere*** (from about 7 to 30 miles above sea level).

The essential problem here is that geoengineering activity as it is currently practiced (and for that matter, bioengineering as well), is operational in the ***troposphere*** (from ground level to an average of about 7 miles above sea level), and not the mid-stratosphere. *There is a world of difference between the two*, but for that discussion you will have to muse yourself further into this paper.

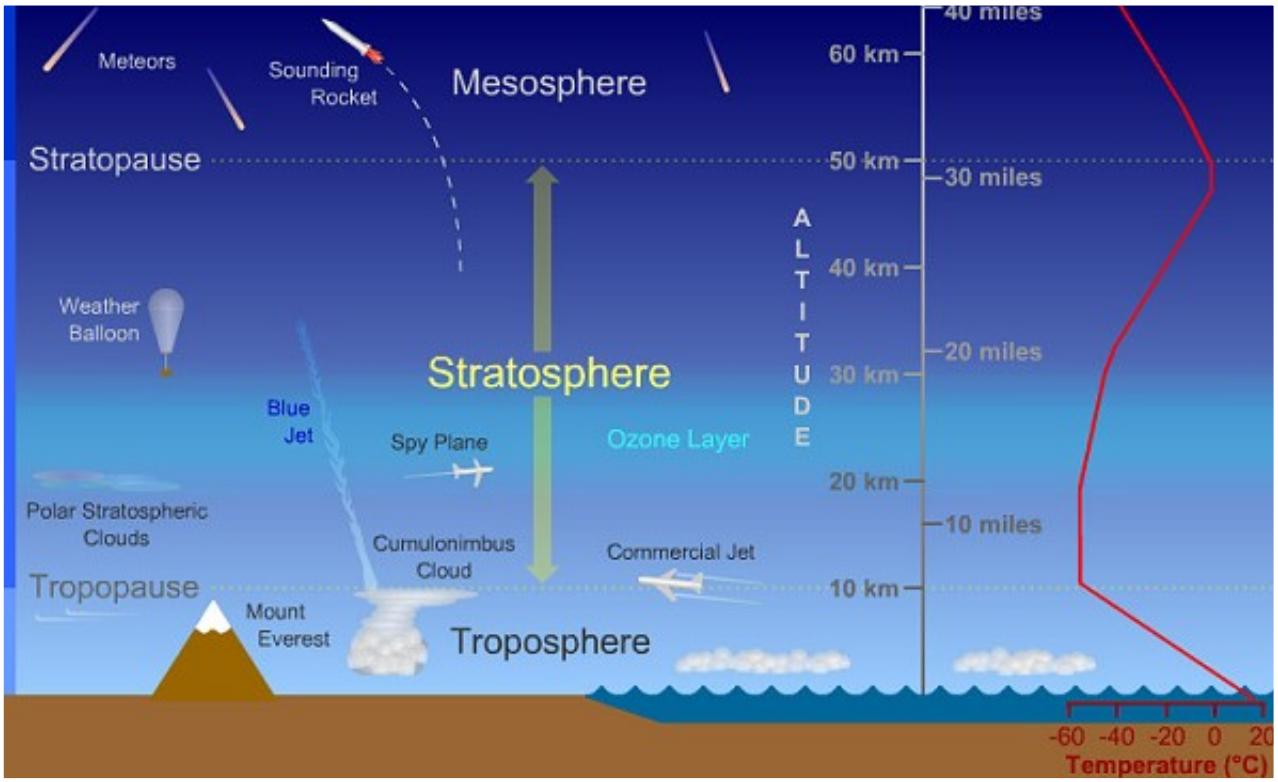


Image source : scied.ucar.edu

Before going further, however, it will be beneficial to provide a brief historical context for the issues and the language involved. There is a track record of controversy and confusion, information and misinformation, official responses and denials, organization and disorganization, research and speculation, and authorities and personalities that now span close to two decades. Unfortunately, the progress of society coming to terms and truthfulness with the deliberate modification of the atmosphere, and ultimately the planet itself, has been slow.

So first, a little history of language and personalities. The journalistic rise of the geoengineering issue began, to my best recollection, in the last few weeks of the year 1998. A certain Canadian journalist came to prominence quite rapidly on a nationally syndicated radio show, with coined language and defined agendas to let the world know that something very different and important was to affect the world. It is fair to say that I have never been at ease with either the language or the a priori “agenda” that was introduced, as they always seemed to be supported with substantial fanfare and attention, but without any basic science to support claims being made. The issue was, essentially, outlined and served to the public without proper investigation and discussion.

It is worthwhile to investigate that history a bit, as it represents a good portion of why we are where we are today. Most of us may not be aware that generational forces are now at play in our understanding of the geoengineering issue. The language introduced at that time was the use of the term “chemtrail”, a term that never did have a formal, accurate, or scientific definition then, and it still does not today. That deficiency alone has been enough to interfere with the proper investigation of environmental pollution and contaminants, and it remains moderately successful to this day. Whether such language of derision and denial, but of popular appeal, was a product of personal creativity or design of influence I may never be able to state with certainty; I do, however, have my opinions on the matter and I see no benefits from the choice. My separation and disdain for populist and ill-defined terminology that is used in vain to seek legal standing is known, and I shall not be party to perpetuate this dubious origin. Only those words that

will stand up in a court of law have merit here, and **you** are the one that will need to make your case.

The second great coup of the early journalistic 'work' was to define, in the eyes of the public, the very reason for the existence of geoengineering programs ***before any science was in place to justify the claim***. Again, it was all far, far "too easy" for one of my persuasion. Check your internet history books, but you will find that a global and covert operation of unprecedented scale was, by use of a curious combination of implication and certainty, ***for the purpose of "reducing global warming.***"

History will show that there has been an incredible level of success in strategy and influence upon public perception with these implants. They are, however, in reality travesties and injustices to the public cause.

What the public was 'given', therefore, was an unsubstantiated agenda, ill-defined language of popular attraction, and a host of ready-made and supported 'detractors' that raised a commotion, provided distraction and dispute; all of these set the stage to successfully avoid journalistic integrity, scientific investigation, and accountability by public representatives. The obstacles were all provided at little cost, but at great expense to the needs and interests of the public.

This strategy of framing public perception and discussion under the guise of potential benefit was generally effective for more than a decade. Hard hitting journalism never did take place, thorough investigations were not launched, scientific work was not supported, and public officials were not held accountable.

The problem that developed was that the claim of 'cooling the planet' by using aircraft to disperse aerosols did not fit the facts of observation. They did not fit them then, and they do not fit them now. It has taken some time for this truth to become evident; I presented my first paper on this topic (*Drought Inducement*, Apr. 2002) in the early part of the last decade. This work was followed by additional papers (Global Warming and Aerosols, Jan. 2004, *A Global Warming Model*, Apr. 2007, and A Geoengineering and Climate Change Model, Jan. 2015) during the course of the successive decades. The tenets of that investigative work are also confirmed on a broader level with documents issued by, for example, the International Panel on Climate Change (IPCC) (International Panel on Climate Change (IPCC) 1999, 17) and NASA ("Clouds & Radiation Fact Sheet : Feature Articles" 2016) on the net heating effects from "thin, high clouds."

High, thin "clouds", including those that originate from an introduced aerosol base, do not cool the planet; they heat it up.

The next piece of the puzzle that we must fit into the picture is Edward Teller, and specifically the paper by him entitled, "Global Warming and Ice Ages: Prospects for Physics-Based Modulation of Global Climate Change." This paper, authored in part by the developer of the hydrogen bomb, is often cited by activists themselves as one of the holy grails that proves that geoengineering operations are in place, and that they are indeed "cooling the planet" and "combating global warming" (albeit covertly, for some unknown reason). There are some important portions of the paper that have not been paid attention to; this omission inappropriately supports a culture of popular belief that lacks scientific foundation.

Edward Teller does indeed propose various schemes for cooling the earth's temperature, including the introduction of aerosols or particulates into the atmosphere. *The issue, however, is **WHERE** in the atmosphere he proposes to do this, and the answer to this question is very relevant to the cause and purpose of this paper*. It is even more revealing to point out the additional options that are both proposed and preferred by Edward Teller in his paper, as they help to place his atmospheric aerosol proposal into

a better perspective.

Let us spend a brief time with the proposals of Edward Teller, as they are outlined in the paper cited above. Please note that even within the introductory notes that Teller uses the phrase of introducing "scatterers" (i.e., light and heat) "**into space** from the vicinity of the earth"; this should give some indication of what the thrust of the thinking process is. Teller proposes to introduce the scatterers into three different locations to artificially cool the earth (Teller 1997, 7):

1. Into the *middle of the stratosphere* (**NOT** the troposphere). The stratosphere is in the upper atmosphere, and the troposphere is the lower atmosphere. This important difference will be discussed in more detail a little later in this paper.

2. In orbit, in **SPACE**, approximately 4000 miles above the earth.

3. Deep in **SPACE**, approximately 400,000 miles from the center of the earth.

An obvious pattern of diverting the heat to locations distant from the earth should be apparent to us; it is one that has not been disclosed sufficiently within the current discussions taking place with respect to both geoengineering and climate control.

The reason the materials are proposed to be so distant from the earth is two-fold:

1. Most of the materials considered will absorb heat.

2. It is desired to have the captured heat radiate into space; not into the earth and its lower atmosphere.

The principles of the approach should not be difficult to grasp here, but they most certainly have been misrepresented in most discussions that are taking place with respect to current and active geoengineering (and bioengineering) operations.

If you hold a parasol over your head on a hot sunny day, it might keep you cooler. The air around you will still absorb that heat, however. The color and material of the umbrella is going to be another factor (i.e, albedo, specific heat, etc.) that you will want to consider. If you want to cool the planet, you are going to have to move the umbrella a lot further away – into space, for example. This is the essence of the Teller paper, and it is important to understand this proposal before certain terms of "solar radiation management" with respect to current geoengineering practices are bandied about. **WHERE** the material is injected into the atmosphere makes a big difference on the net heat effect, and this topic has largely been ignored within the popular circles of discussion on geoengineering. This discussion should lead one to think much more deeply about what the definition of geoengineering actually is, and how that definition compares to the realities of the projects and operations **AS THEY ARE CURRENTLY AND ACTIVELY PRACTICED**. Climate modification strategies, or more appropriately, environmental control strategies, are only one part of a much bigger picture.

The Teller paper has gained a lot of mileage in the geoengineering circles, and it is my opinion that much of this mileage is without merit and in ignorance. I must credit the Canadian journalist again for the majority of that progress, as the seed was planted very early in the game with a great deal of supposed 'alternative media' support. The Teller paper never explained the physics or consequences of introducing ***massive amounts of specific aerosol types into the lower atmosphere***. The reason for this is simple; the paper was never intended to explain it because this act is not a viable way to cool down the earth. The Teller paper was inappropriately supported and attached to the observation of and

media coverage of geoengineering (and bioengineering) operations as they are currently in place and operational.

Now let's discuss some of the differences between the troposphere and the stratosphere in more detail. The distinction between what is real and hypothetical will never take place until we put at least some effort in that direction.

The troposphere is where weather is made. The troposphere is where airplanes generally fly. The troposphere is where the air is more dense and it is where pollution has a more immediate impact upon us. It is the where the majority of the earth's atmosphere is, and consequently it is where we can breath and live. The troposphere has a profound and immediate impact upon our very existence on this planet. Roughly ¾ of the mass of the entire atmosphere is contained within the troposphere, the average height is about seven miles (a trip to the grocery store), and it is a veritable delicate eggshell of life for this planet. The troposphere is delicate and crucial to all life on this planet, and disturbance or pollution within it threatens our very existence. It cannot sustain serious damage without immediate consequence.

The stratosphere is where the air is very thin, centering closer to an average height of 20 miles above the earth. Airplanes cannot and do not fly in the mid-stratosphere regularly, as there is not enough air to support them; only specialized or high performance aircraft will rarely be able to visit this transitional zone to space. Geoengineering (and bioengineering) operations, in a practical aviation sense with current technology, *cannot be practiced there*. Teller makes clear that **the preferred target for his ideas is generally in space**, where the heat can feasibly be diverted or managed AWAY from the earth.

Readers may also to review an interview from several years past on this and related subjects; it is available via Freedom For All TV which is based in Canada ("Freedom Free For All TV: Clifford Carnicom Interview – YouTube" 2016).

It is now that we can understand a portion of the dilemma that is before us. If we accept that aviation is a primary tool that is actively being used to artificially modify the atmosphere, then we know that this is occurring within the troposphere, and not the mid-stratosphere. But we also know, at least as based upon Teller's models, that mid-stratospheric operations would be required to effect any type of practical mitigation to global climate warming. Teller also lets us know that long term climate control by aircraft is hardly a preferred method, as it requires specialized performance aircraft and requires continual renewal to maintain its effectiveness. What is known, therefore, is that geoengineering (and bioengineering) operations AS THEY ARE NOW PRACTICED IN THE LOWER ATMOSPHERE, i.e., the troposphere, are not directed and motivated primarily toward climate control, including the purported mitigation of "global warming".

The forces behind the implementation of active and current geoengineering operations have always understood this, and it never has been a logical motive for the current operations. This is the case regardless of popular conceptions with popular appeal that have been circulated for far too long without contest.

It is certainly past time for the citizens of the world to understand this as well, including many of the well intended environmental individuals and organizations that affect this same citizenry.

The language may have changed some over the recent decades, but the confusion and obfuscation remains as strong as ever now. It is past time to play the cards straight and to force each of us to confront the truths of the matter.

We must now pay some attention to the language that is now in vogue and how it changes. The terms of ‘chemtrails’ and ‘global warming’ were foisted upon us in earlier days; aerosols and particulates were always favored from my position, but those terms do not exactly have popular twitter appeal. They do, however, remain valid and accurate as far as the substance of the matter.

We have transitioned now to more socially acceptable terms of climate change, geoengineering, and “solar radiation management”. Unfortunately, the confusion behind the terms remains as dysfunctional as ever. We can be assured that the definition of geoengineering (and bioengineering) as I understand them, are not at all in agreement with many popularly held notions of that same term. Environmental modification and control is simply one small slice of the bigger pie, as far as I am concerned. I will reiterate my scope of consideration for the term near the end of this paper.

We should, however, at least seek out the definition of the popular term (by many environmental activists as well) “Solar Radiation Management”. This term refers to the management of climate control issues through a modification of the earth’s heat balance; only one option of which includes the introduction of particulate matter into the *stratosphere* (NOT the troposphere).

Specifically, from the Royal Society:

“Solar Radiation Management (SRM) [are] techniques which reflect a small percentage of the sun’s light and heat back into space.”

Again, I will make the case here that the term cannot and does not apply to current and active geoengineering (and bioengineering) operations as they are currently practiced in the lower atmosphere (troposphere). The stratosphere is not the troposphere, and the troposphere is not the stratosphere. The physics of each layer within the atmosphere are completely different from one another and they cannot, in general, be “used” for the same purposes. You cannot talk about them or treat them as though there is no difference of importance.

You cannot rely on methods and definitions that have physical principles, meaning and application within a certain domain (i.e, the stratosphere) and then use those same methods and principles for a different domain (i.e., the troposphere).

To further assume that the practitioners of active geoengineering (and bioengineering) operations are active within the mid-stratosphere when they are not (as determined by direct observation) further undermines the case for protest of the actual modification of the lower atmosphere (i.e., the troposphere) that is taking place. Talk about misrepresentation and obfuscation of a global environmental and health issue; there is plenty of fodder to work with here.

To claim further that the motives of the geoengineering practitioners are beneficial and well-intended (i.e, “solar radiation management and the curtailment of “global warming”) but to know that the operations actually cause harm because of a net heating effect is equally misguided. The operations as they are practiced are not an experiment of beneficent intent; the developers understand the physics and the applications quite well (within their sphere of interest). Rest assured that the web of deployment is not centered on, or confined to, the principles of “Solar Radiation Management”.

Current operations directly impact and affect the lower atmosphere (troposphere) in which we all live and breathe; this assertion is now supported directly by field measurements. The particulate counts are real and observable, and they have been made. The measurements referred to are not worthy solely of “climate control” consideration; they are, however, of immediate impact and detriment to your health and

well-being. Gravity works, and the materials do ultimately reach ground level and they are measurable in direct correspondence to activity levels. You may wish to think a little closer to home, in some respects, and become active on that front.

Incidentally, attention should probably be called to a particular segment of a particular interview from several years past; my recollection is that a Mr. George Knapp from the Coast to Coast network moderated the affair. It is another part of the social history, “alternative” media, and social impressionability that precedes us. You may or may not choose to investigate the affair as I report it here.

It was not made clear prior that multiple parties would be available on the interview and fair representation on the sides of an issue can always be a topic of debate. What remains of interest to me is a particular response evoked from a particular Canadian journalist on the panel when I introduced the subject of “biological operations” (e.g., bioengineering) into the discussion. I think it is fair to say that I must have struck a nerve in the flow or agenda of the conversation. After I made the claim that biological operations are indeed an active component of the aerosol operations as they are now practiced, the particular response from this “Canadian journalist” was:

“There is not! There is not! I repeat there is not any evidence of biological operations available!” (to my best recollection). The response was immediate, emphatic and unqualified.

The show’s host then immediately switched to a commercial break after this statement was made. You may judge for yourself what dynamics transpired at that moment, but the forceful response certainly struck me as out of balance within a purported discussion of important environmental issues.

In the time made available, I refuted the unsubstantiated claim then. I refute it now as well.

I am only one researcher, and I hardly make claim to knowing all shades of an operation that I am not party to. Over the years, however, a ‘list of applications” has been developed which remains internally consistent with all known and observed data. The list has not changed in any significant fashion for more than a decade. I will continue to voice the claim that no discussion of geoengineering (or bioengineering) is of adequate scope unless it delves into each of the following domains:

1. Environmental modification and control (of broader scope than global temperature issues).
2. Military applications
3. Electromagnetic operations
4. Biological operations (including bioengineering)
5. Geophysical considerations
6. Surveillance System Development (LIDAR applications)
7. Exotic technology system monitoring

The prime-time audience may not be ready for the realities and implications of the various aspects itemized above, but they are ultimately deserving.

There are parties that continue to promulgate the thesis that Solar Radiation Management, i.e., the attempted mitigation of “global warming” via stratospheric modification is at the crux of active geoengineering operations. There frequently remains the implication that the motives for operation are of good intention even if the observations of consequence contradict that claim. The use of Edward Teller’s paper is frequently cited as the basis for the implementation of theoretical concepts into actual operation, regardless of the physics or details involved. There are seldom, if ever, references to differences

between the impact of operations in the troposphere (lower atmosphere) vs. the stratosphere (upper atmosphere). There frequently is the assumption that the agendas of operation are known and defined by popular perceptions. For close to two decades, the evidence does not support these claims and misrepresentation is in place.

I would encourage that each of us seek common ground and understanding of the forces and applications that are likely operative within the spheres of active and practiced geoengineering (and bioengineering) operations. There is some value in review and observation of the social history and assumptions that accompany our evolution in the pursuit of truth. It is also wise to force good science and reason continuously into our deliberations and debates, and to admit our mistakes so that we may rise above them. If information, analyses and representations are inconsistent we must each be willing to confront those positions. I believe that the phrase has already been coined for us – “The Truth is Out There”, and it is the job of each one of us to help find it.

Sincerely,

Clifford E Carnicom
April 06, 2016
Edit May 14, 2016
Edit July 05, 2016

Additional Notes:

Readers may also wish to become familiar with a model document that proposes an international ban on geoengineering (and bioengineering) practices. Please refer to StopGlobalGeoengineering.org for additional information(“Global Ban on Geoengineering – Stop Global Geoengineering” 2016).

Appreciation is extended to Harold Saive for a note of clarification within this paper.

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In Memoriam

Apr 28, 2016

In Memoriam
by
Clifford E Carnicom
April 28, 2016

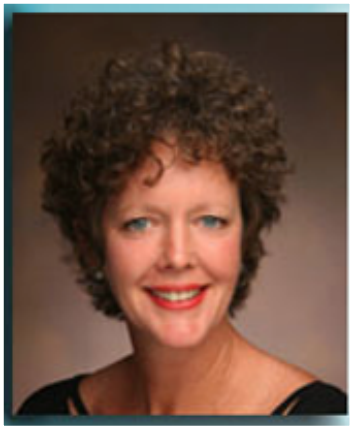
There are many that serve to champion human rights with no return of fame and glory; they do so passionately and unselfishly to make this world a better place for us all. In many cases, we never even know who they are as the winds of public knowledge and awareness are often transient, and they soon pass us by. This page calls attention to only a few of such individuals that I have come to known over the years; those that follow below are entitled to honor and appreciation from each of us. Each of them has contributed in significant ways to the betterment of mankind. May they rest in peace.

Clifford E Carnicom

Dr. Mike Castle
July 2, 2015

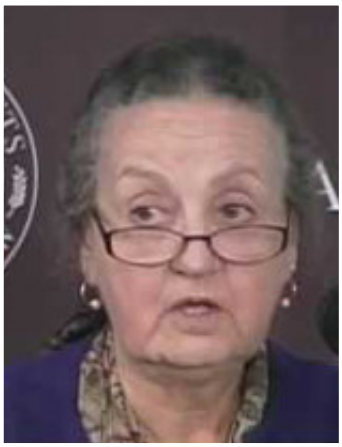
Harriet Fels
April 17, 2009

A. C. Griffith “Griff”
June 19, 2012



Dr. Lorraine Hurley MD
October 2, 2015

Carl Lewis McBrayer
September 6, 2013



Dr. Ilya Sandra Perlingieri
October 6, 2013

Dr Gwen Scott, N.D.
March 15, 2015

Alfred Wyant Stites
April 11, 2016

May
A Week in the Life of Carnicom Institute
May 14, 2016

A Week in the Life of Carnicom Institute
A Diary

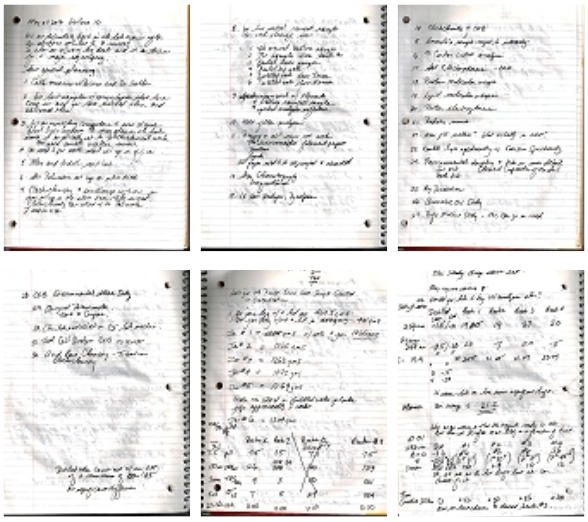
by
Clifford E Carnicom
May 14 2016

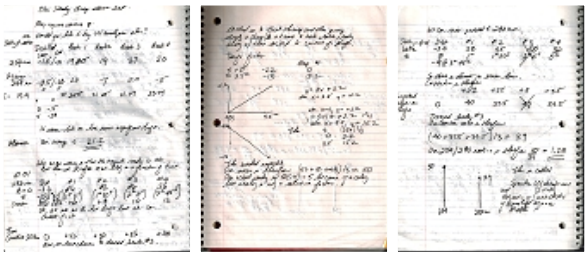
To give the public some insight into the practical affairs of work that transpires at Carnicom Institute on a daily basis, the following diary of a representative week is offered:

Saturday, May 07, 2016:

Back in the laboratory in Idaho after a magnificent winter in the southwest portion of the country. Field studies and research continue throughout the year regardless of location, but it is good to have access to a laboratory again for several months. Spent the first half of the morning unpacking, packing and regrouping for the summer activities.

Forming a daily outline is a common task; this time the outline is for a longer time scale. Within about 20 minutes, 32 projects have been identified as topics in immediate need of research. The list is actually only partial, but it represents a good start. It is understood that completion of the list can never be achieved from this sole standpoint, but it is still valuable to lay out what needs to be done. If nothing else, it serves to help prioritize so that I can isolate the half dozen projects that are likely to show some progress during the upcoming season.





Lab Notes, May 07 2016
Volume 19

The list now includes, for example:

1. More samples are being received from the public on a regular basis. Each sample is basically a project in its own right, as little to nothing is usually known about the source or nature of the material. Forensics are a valuable asset in this line of work. At least a half dozen on tap, and as usual I will have to zero in on those that seem most useful with environmental and health issues.
2. Computer setups taking place today. A lot of specialized software operating here, with four computers now operational and dedicated to various services, projects and instruments.
3. Setups today include that transfer of electrochemistry field operations to the lab environment, and some important technology that supports that work in the future. A very important field of study that has developed here, devoted strongly (but not limited to) the world of inorganic identifications (e.g., trace metals). Also a couple of primitive but useful emission spectrometers set up today; these meet another niche in the long line of spectroscopy methods that have been developed over the years (e.g., IR, Vis, UV).
4. Rainfall samples are a primary focus of current work. Electrochemistry at the heart of the methods underway, but many other techniques to apply as well. Six samples on immediate tap (maybe the pun is intended). Water chemistry in general is under serious study, contaminant range on the order of PPM is on the immediate horizon. Even so-called “distilled” water is under review; it may not be as pure as we have all been led to believe. The need for the “ultra-pure” water market is now evident.
5. A HEPA filter, running indoors for the last six months, is one loaded target to study. A whole world taking place in there.. There are papers to be written on the quality of indoor air (many surprises for most of us there), let alone those that have been started on the outdoor air conditions. See some of the recent papers if you want to start gettting an idea of some of the problems (hint : the EPA is included).
6. Gas chromatography methods will be renewed. Young territory here, but another good niche in the world of volatiles.
7. IR hair analysis, pyrolysis techniques to be renewed. Some interesting issues emerged here last year, including potential toxins to be looking at. Gas IR methods are now in place from the close of last season; an extremely valuable method.
8. Bacterial electrochemistry on the agenda. Fuel cell investigations also at some point.
9. IR work, revisited, is a huge plate ahead. Environmental Filament Project revisited, proteins, lipids. All papers need to regrouped, reprinted, resorted. A significant setback to the organization of the work from the blizzard that hit during the winter travel.
10. Unique sample from last year needs to be revisited.
11. Low tech method developed last year to estimate carbon – hydrogen ratio for organics is potentially valuable. Bring it back.
12. Gel electrophoresis – DNA experiments running again. New info on DNA prep now available, hopefully some more headway now. Both DNA and protein methods desirable.
13. Protein molecular weight estimate.

14. Lipid molecular weight estimate; lower tech method for volatiles identified.
15. Radiation measurement would be useful. No money for the meter right now. There are some initial signs within electrochemical rainfall tests that radiation may be an issue that is measurable. Fukishima?
16. New pH, conductivity, ORP combined meter would be useful. No money for that right now.
17. Comparison of visible light spectrometry vs. emission spectroscopy results would be valuable.
18. Environmental sampling of soils would be valuable; seems more remote and less likely with time available.
19. Dissection project, a couple of years on hold now. Remember the the pig lung?
20. Aromatic oil studies; a whole chemistry field in itself. Time, time..
21. Revisit of frequency studies and methods applied to cultures; “Rife” investigations. Lots of open territory on that one.
22. CDB environmental stress study.
23. Compare different potentiostats (redundancy of results always desirable).
24. Chemistry lab simulator installed on 3rd terminal.
25. Acid-base chemistry; comparison of titration methods, esp. electrochemical with conventional.

That is a partial list. Give me a few more lifetimes and I will try to manage it. We are running out of time to assume that business as usual is OK. Do not assume *anything* and we will still be behind. The list only grows, but CI keeps chipping away. The MRP is collecting data nicely.

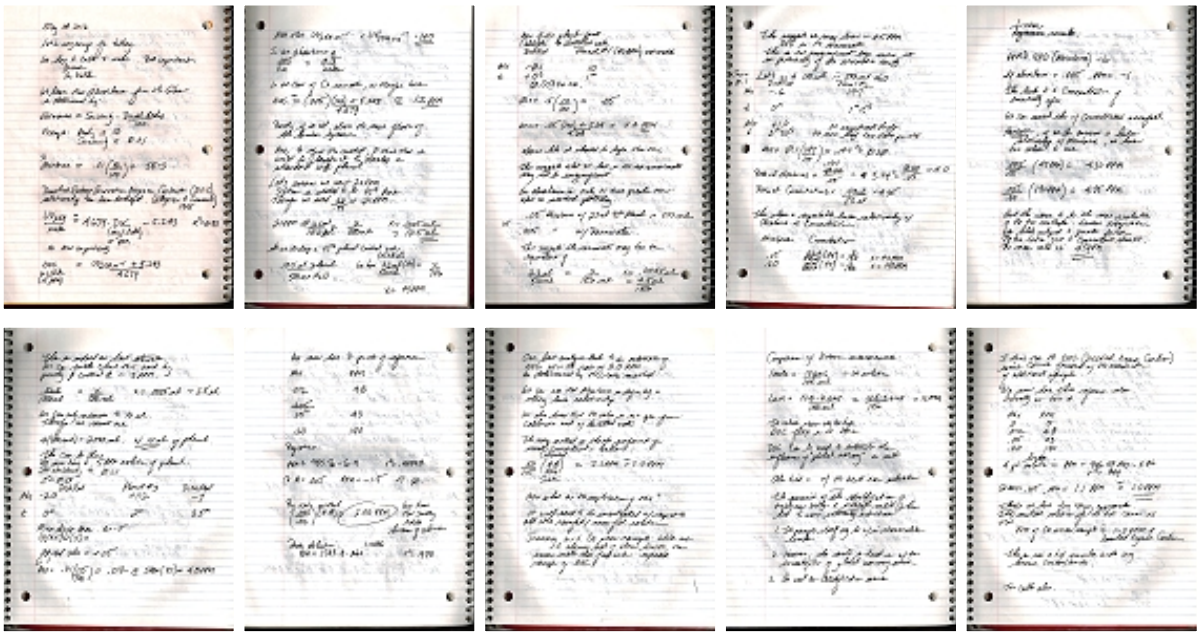
Colorado snow sample processing started, including concentration work. Initial tests on pH, oxidation reduction potential, conductivity, TDS, and UV measurements completed. pH shows up alkaline again; seems to be a pretty strong pattern there. See the work from years ago. Relationships between oxides and hydroxides to be explored. Trace metal determinations should be helpful here. ORP an interesting topic, but less commonly used and understood. Might be valuable, but no significant result there as of yet. Index of refraction comparison also a tame issue, it seems. UV work produces highly repeatable results; leads to method to determine dissolved aromatic organic content in solution. Run references with phenols. Gilson time drift can be compensated for, as required. Only slight detection in sample apparent at this point, but method developed is extremely valuable regardless of what develops here.

The internet here is the pits, it is essentially non-functional. This has been going on since the move to the new location. It is hindering and interfering with the work, I need information now and always, lots of it, and I need it fast. This is a problem. Running on a hotspot card as best we can. Once again, the issue is money on that one; a commercial internet account is needed here – long overdue.

That is a round for today.. A couple of calls and this report will tie up a good part of tomorrow. Shutdown near 2100, on the early side no less.

Sunday, May 08, 2016:

Two extended calls today related to work projects and collaborative efforts. The calls were productive but they do consume a good chunk of the daylight hours.



Lab Notes, May 08 2016
Vol. 19

A day of DOC (Dissolved Organic Carbon) investigations and methods development. Literature shows a strong linear relationship between UV 254 nm absorption and DOC. Standards developed at different concentrations; very strong linear relationship established and duplicated (r^2 = .999 n = 4). Good work there, UV 254 has some real value, even with limited and old equipment.

CO snowmelt sample analyzed per the standards comparison. The number is coming in low, on the order of 1-2 PPM. Dissolved Organic Carbon topic is quite a bit more relevant than we might expect, but in some unexpected ways. DOC ends up being heavily tied into the 'global warming' issue and the so-called carbon footprint topic – but not in a way that many of us might think. Value determined is in line with low values tracing back to 1995 research papers on DOC of 88 different natural water sources. We all get to ask what does a low DOC value in rainfall actually tell us? Suggest we start by reading the Clash of Evidence paper…

Also a strong tie in of DOC with the acid- rain issue. Again, all may not be as it appears to be or as many of us think. pH data is consistently alkaline with the rainfall samples. High DOC values apparently will sway towards the acidic side. Low DOC values (as being found here on first run) are consistent are therefore more consistent with an alkaline sway (as is also being found). Twenty to thirty years ago we would all be talking about the 'acid-rain' issue; notice that does not seem to be so popular anymore? The winds of environmental politics, snapchats and selfies…

As usual, the plot thickens, and DOC may end up being a more valuable tool than originally perceived. Issues of the Clash of Evidence paper, 'global warming' (emphasis upon quotes here), acid rain, may all come into play as we learn more here. The evidence drives the truth, not our perceptions or what we are told is the state of affairs.

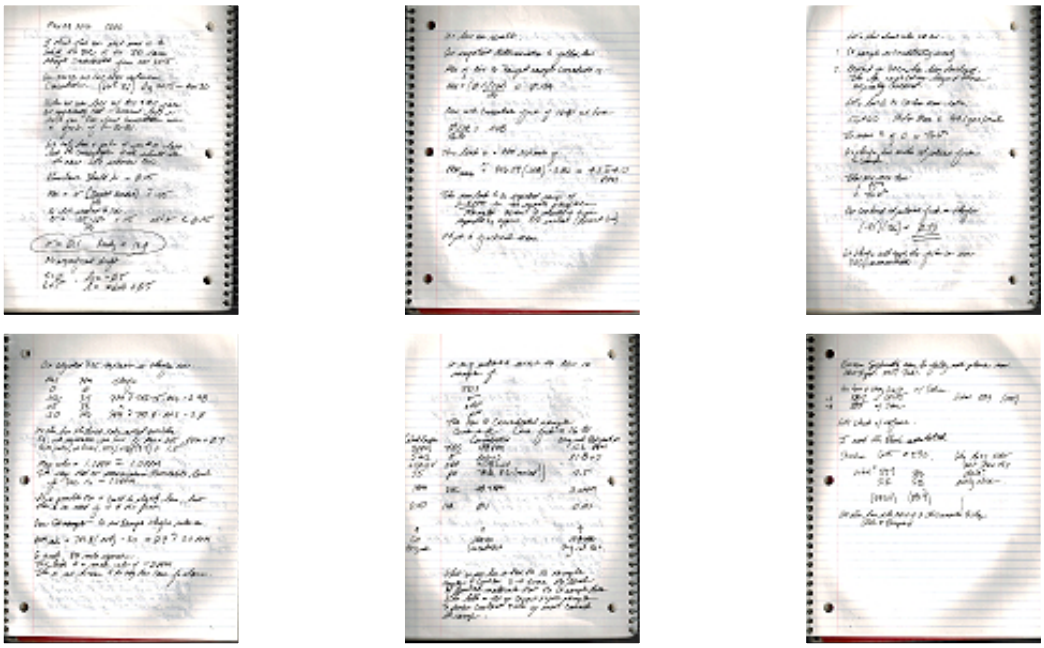
The DOC project is a young one, so it is not time to read too much into the picture. Collect the data, as usual. Will reopen the Nov rainfall sample case, and examine that sample further.

CO snow melt sample continues to be concentrated, should be ready within a couple more days.

End at 0230, the wee hours.

Monday, May 09, 2016:

Morning hours occupied with the editing of two documents; the first related to a European interview and the second with respect to a collaboration project document. Time devoted to planting the seeds of future awareness and involvement; I hope that they will be fruitful in the years ahead.



Lab Notes, May 09 2016
Vol. 19

A revisit to the Idaho rain sample of Nov 2015. There is now the advantage of two distinct precipitation samples of sufficient quantity collected under known conditions over a period of time and distance. It takes approximately 3-4 days to prepare and concentrate each sample; accelerated evaporation must be done carefully and with good measurements for volume.

The DOC calibration standards are further adjusted by the carbon fraction within the phenol standard.

DOC measurement for the Idaho sample takes place. Measurements also extended to include pH, Total Dissolved Solids (TDS), conductivity, and Oxidation Reduction Potential (ORP). First indications are that the Idaho sample has foreign materials on the order of 3 times the level of the CO sample; filtration of the snow sample may also be a factor here. The CO sample evaporation process should be complete by tomorrow, slow and steady. We definitely have some soluble metallic salts in the ID sample; time will tell with CO after concentration is complete. It is difficult for commercial lab tests to be productive unless you know what to look for first; this work is geared heavily toward that end. From the November rainfall work, the list is already rather long, including metallic salts, organophosphates, pesticides, and biologicals, for example.

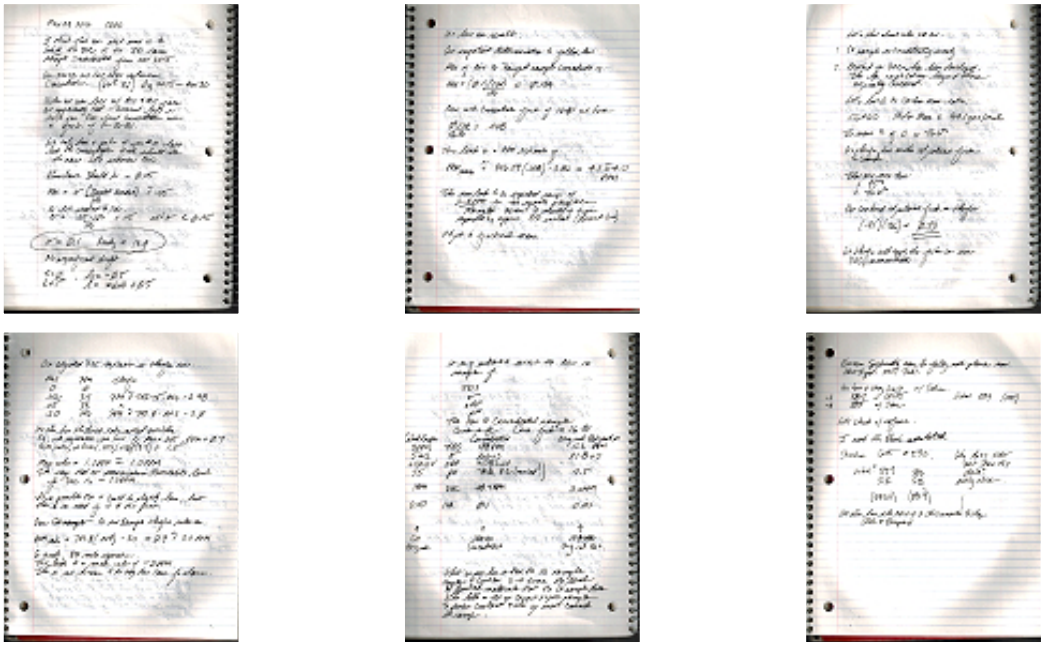
Beginning emission spectroscopy work in the evening hours. Development of the setup, lighting, flame source, etc. A couple of metallic salt references explored, including sodium and strontium. Variation of the spectrum with respect to molecular form quickly comes to light (more puns here without much effort) as strontium introduces the first puzzle of the process. Investigation of research papers within the

fireworks world (pyrotechics) shows how the oxide forms can vary dramatically from the elemental and solution forms). Every field of study is its own ballgame, but time to get the feet wet on emission spectroscopy also. Application of the method is likely to be limited, namely because of difficulties of acquiring sufficient materials in solid form, but it is another good tool to get under the belt for certain circumstances.

Approx. shutdown at 0200, call it another day, the tortoise keeps marching…

Tuesday, May 10, 2016:

Detailed measurements today of the simpler parameters (pH, conductivity, TDS, ORP, DOC) of the three precipitation samples, one from CO, one from ID, and one from NM. Sample set is collected over 6 months of time, spans a considerable distance, and now begins to provide some valuable redundant data for comparison.



Lab Notes, May 10 2016
Vol. 19

The results are quite similar with one another in a general sense. The portrait being created is one of further investigation as to metallic salt composition as well as the basis for alkalinity across all samples. The dissolved organic carbon levels are quite low in all cases; further relationships between this finding and climate/acid rain issues will be of interest if time permits.

Assessment of the rainfall samples to date indicates the following potential areas of concern and further investigation:

1. Dissolved ionic materials are present at measurable levels, on the average order of 7 PPM. This is enough to warrant deeper study, as 2 PPM of Al has already been demonstrated to be out of ordinary bounds.
2. Alkaline nature seems evident, hydroxides require further identification.
3. Relatively low levels of dissolved organic carbon (DOC). Interesting issues arise on this with respect to global climate influence and acid-rain issues.

4. From Nov work, organics and biologicals are indeed present. Further study of this as well, especially with the CO concentrate.
5. Organophosphates, nicotinioids, pesticides remains candidates for further study.

Next on tap with this work: Visual analysis of concentrated samples, microscopic study, trace metal investigations (electrochemical), infra red work, and emission spectroscopy (if samples can be developed).

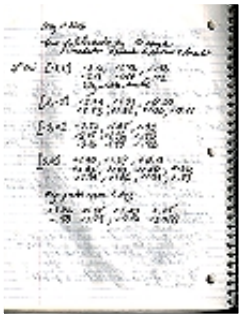
Certainly this one project with these three samples alone could tie me up for the next week or two, there are no shortcuts here and the work is detailed and demanding.

Wednesday, May 11, 2016:

Significant and time consuming administrative paperwork tended to today. Not sure if any time for lab will be available yet or not. Also an extended CI call again tonight. I also need to ride my bicycle soon, as I am overdue for putting around town and trail. Methinks that the ID sun has to be delivering again soon..

… It was a veeery long call tonight.

In the late hours, started the initial rainfall electrochemistry studies via voltammetry.



Lab Notes, May 11 2016
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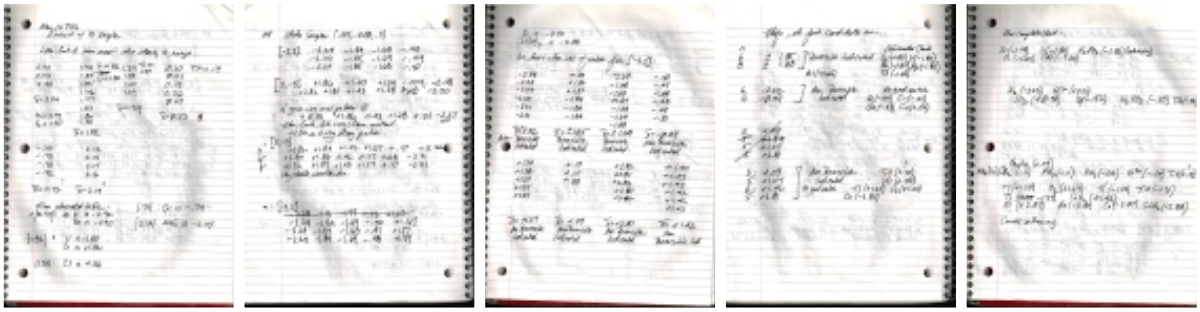
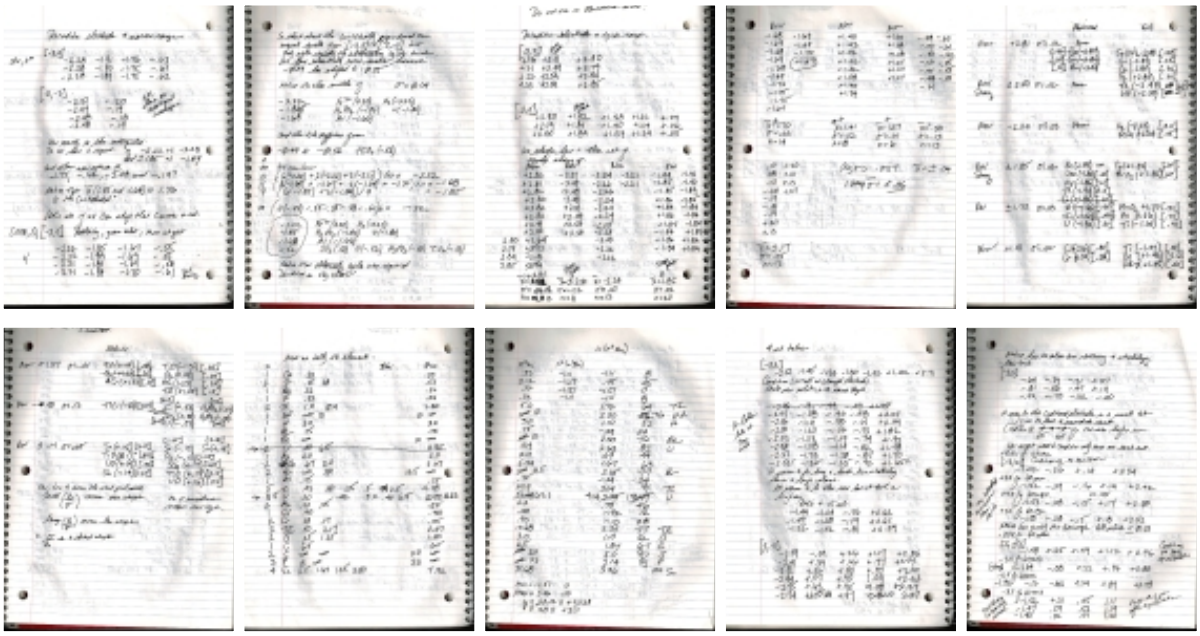
Thursday, May 12, 2016:

Electrochemistry (voltammetry) work all day and well into the night. Lots of steady and patient work ahead of me now. Don’t expect any daily drama, as it is all happening in the notes for the foreseeable future.





Jun

The Demise of Rainwater

Jun 19, 2016

The Demise of Rainwater

by
Clifford E Carnicom

A Paper to be Developed During
the Summer of 2016
(Last Edit Jun 20 2016)

"***The single most important chemical species in clouds and precipitation is the .. pH value.***"

Paul Crutzen, Nobel Prize Winner in Chemistry, 1995

Atmosphere, Climate and Change, Thomas Graedel & Paul J. Crutzen

Scientific American Library, 1997

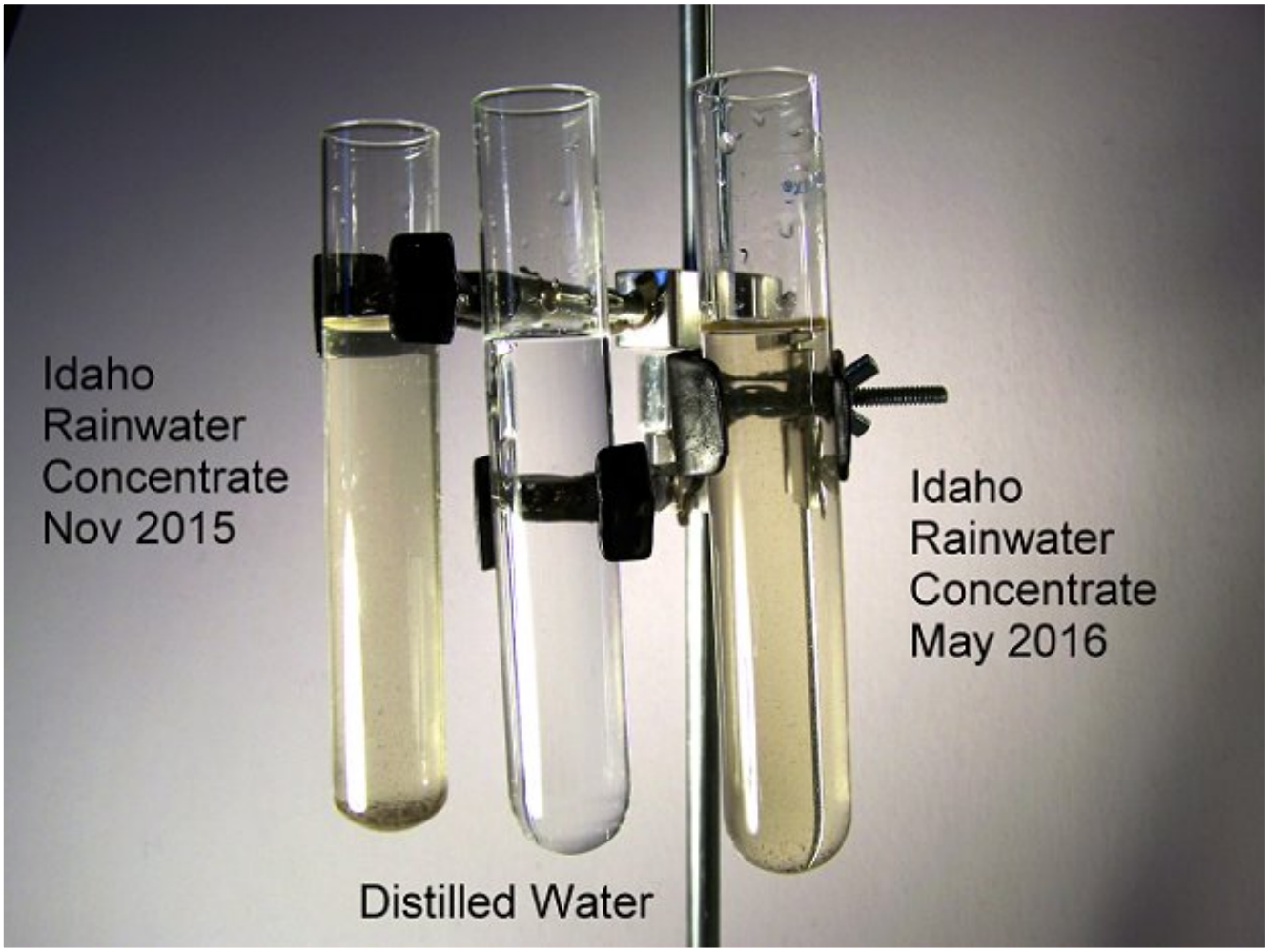


Photo : Carnicom Institute

An analysis of five rainfall samples collected over a period of six months and spanning three states in the western United States has been completed. There are five conclusions that are forthcoming:

1. The rainfall samples studied portray a smorgasbord of contamination. The contaminants appear to be both complex and numerous in nature.

2. There does not appear to be effective or comprehensive monitoring or regulation of the state of air quality, and consequently, rainfall quality in the United States at this time.

3. The results of the current analysis, utilizing more capable equipment and methods, are highly consistent with those that originated from this researcher close to two decades ago.

4. All reasonable requests or demands by the citizenry for the investigation and addressing of this state of affairs over this same time period have been refused or denied.

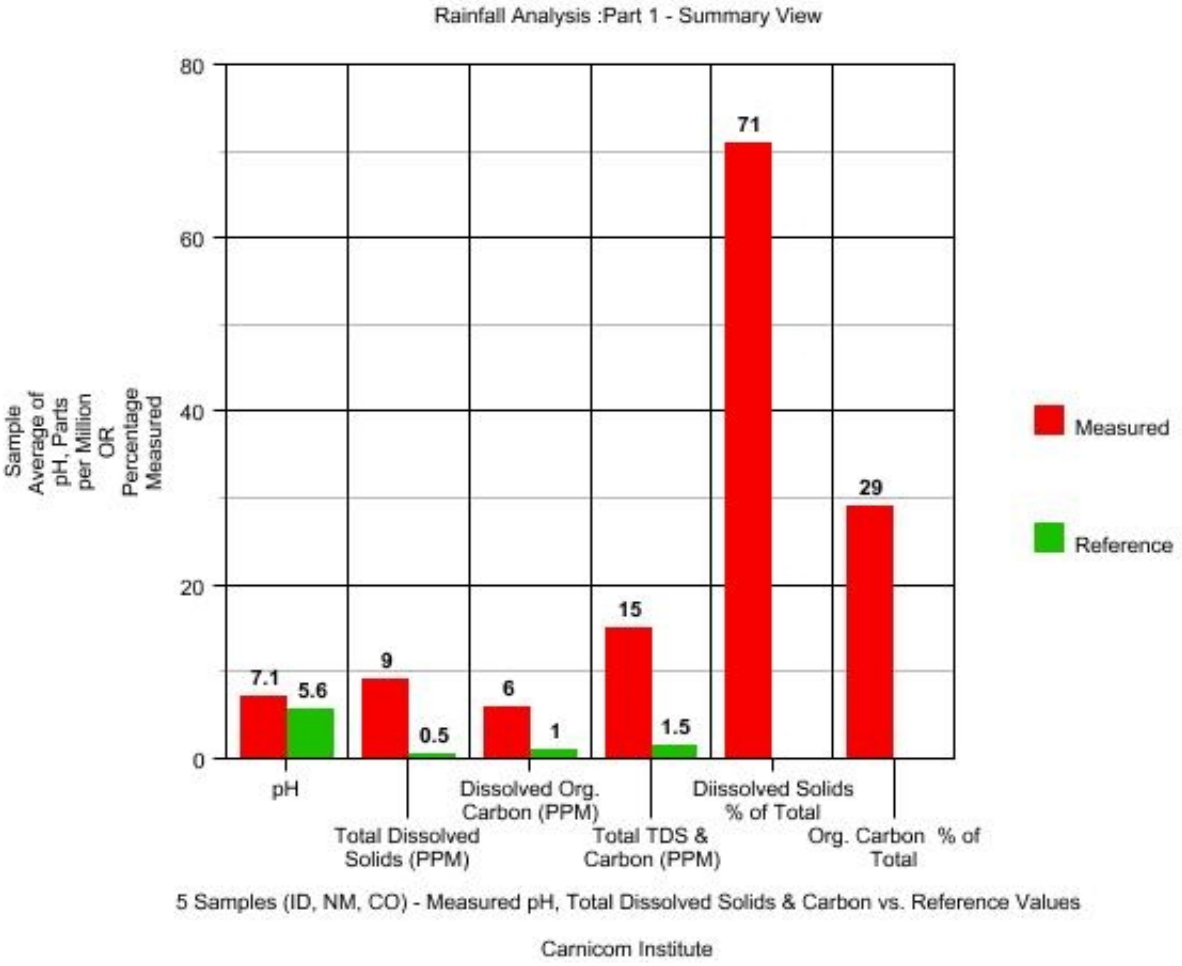
5. The level of contamination that exists poses both a risk and a threat to health, agriculture, biology, and the welfare of the planet.

Let us now proceed with some of the details.

We can begin with the pH, i.e., the acid or alkaline nature of rainfall. Biochemical reactions take place (or, for that matter, do not take place..) at a specific temperature and pH. If the system or environment for that reaction is disturbed with respect to the acidity and temperature, then the reaction itself is interfered with. If the conditions depart far enough from what is required, the reaction may simply not even take place at all. Such is the risk of interference to the acid-base nature of rainfall, upon which all life on this planet depends.

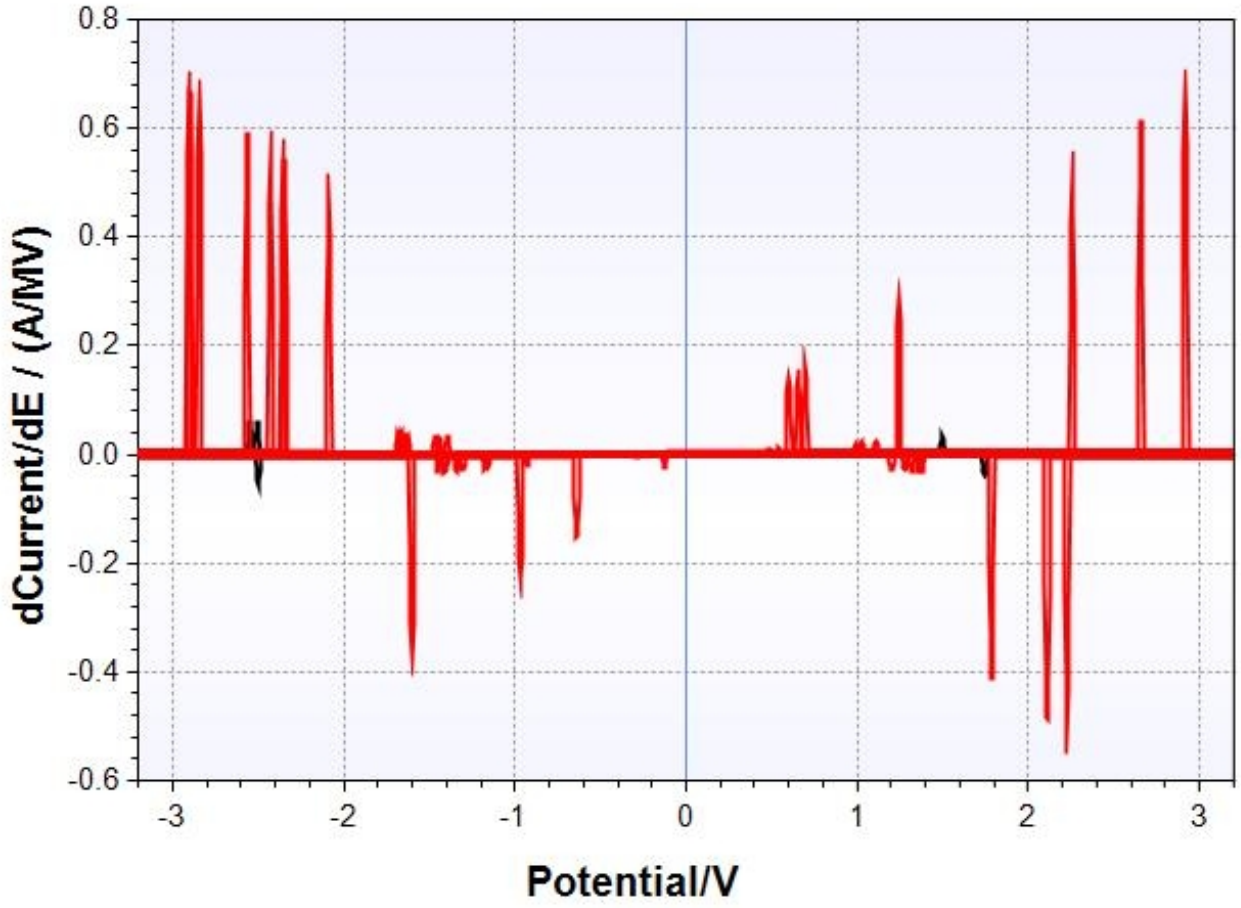
To be continued.

PART I: SUMMARY VIEW


Rainfall Analysis :Part 1 - Summary View
Sample Average of pH, Parts per Million OR Percentage Measured
80
60
40
20
0
7.1
5.6
9
0.5
6
1
15
1.5
71
29
pH
Total Dissolved Solids (PPM)
Dissolved Org. Carbon (PPM)
Total TDS & Carbon (PPM)
Diissolved Solids % of Total
Org. Carbon % of Total
Measured
Reference
5 Samples (ID, NM, CO) - Measured pH, Total Dissolved Solids & Carbon vs. Reference Values
Carnicom Institute

UV Detector & Lab Equipment Used for Summary View Data

PART II: TRACE METAL ANALYSIS


dCurrent/dE / (A/MV)
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-3
-2
-1
0
1
2
3
Potential/V

Electrochemical Signature of Rainwater Tests for Trace Metals
as Determined by Differential Normal Pulse Voltammetry

The following metallic elements have been determined to exist, or to be strong candidates to exist, within a series of five rainwater samples that have been tested for trace metals. The samples span three states across the country and six months of time. The method applied is that of Differential Normal Pulse Voltammetry. The level of detection for the method is on the order of parts per million (PPM). This list considerably extends the scope of consideration for the future investigation and detection of metallic elements within rainwater. The findings in the upper portion of the table are highly consistent with those under reporting by various laboratories across the country; those in the lower half serve to prompt further investigations into additional elements that are highly related in their properties within the periodic table. An examination of the physical properties of these elements, in detail, will likely provide additional insight into the applications of use for these same elements. It can be noticed that the majority of elements within the list act as reducing agents.

Element	**Measured Mean Redox Voltage (Absolute Value)**	**Actual Redox Voltage (Absolute Value)**

Aug

GeoEngineering - BioEngineering : A System View

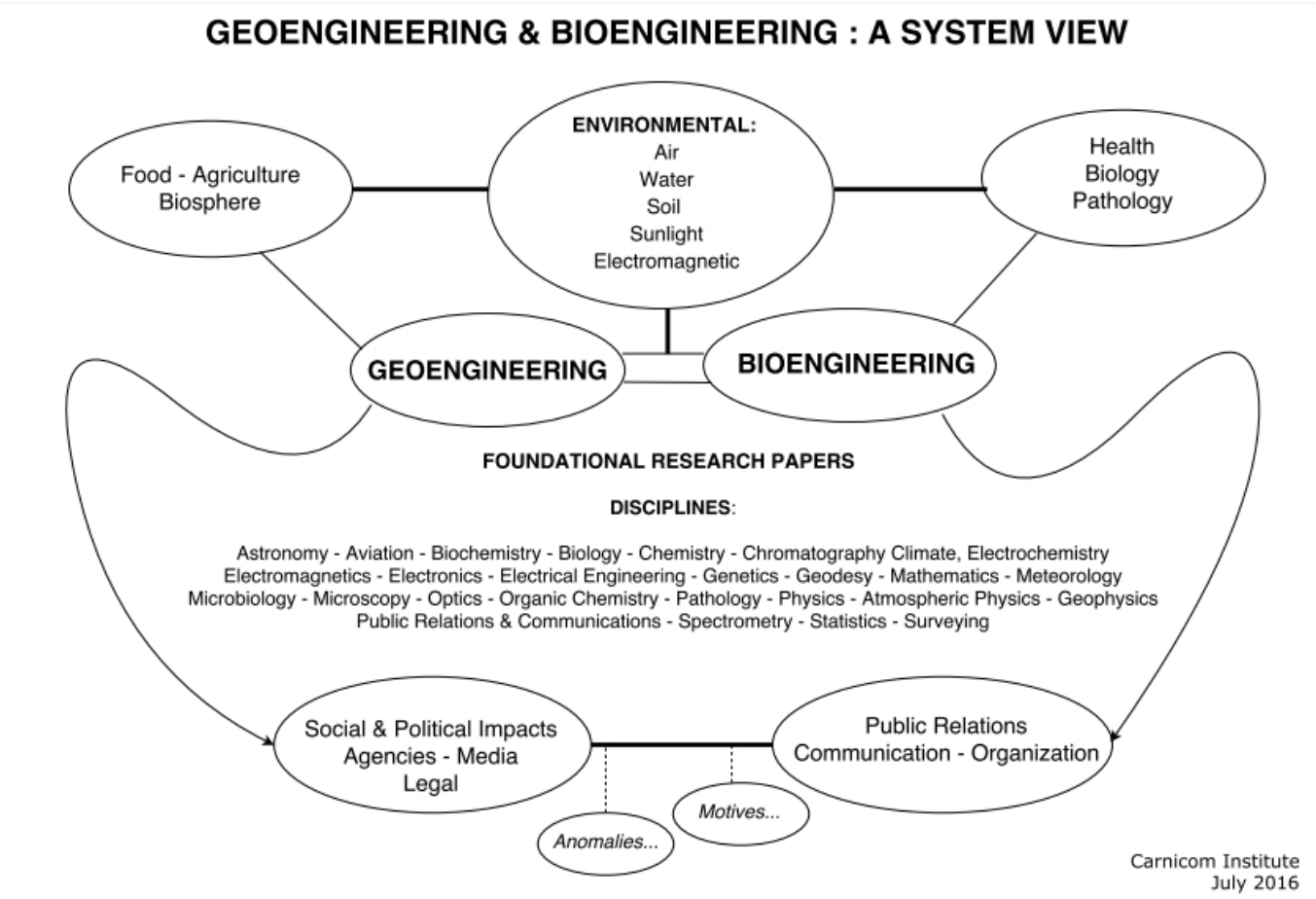
Aug 8, 2016

GeoEngineering & BioEngineering:

A System View

Clifford E Carnicom

Aug 08 2016



Presented at the National Health Freedom Congress

Minnesota, July 2016

Morgellons : An International Presence

Aug 11, 2016

Morgellons:

An International Presence

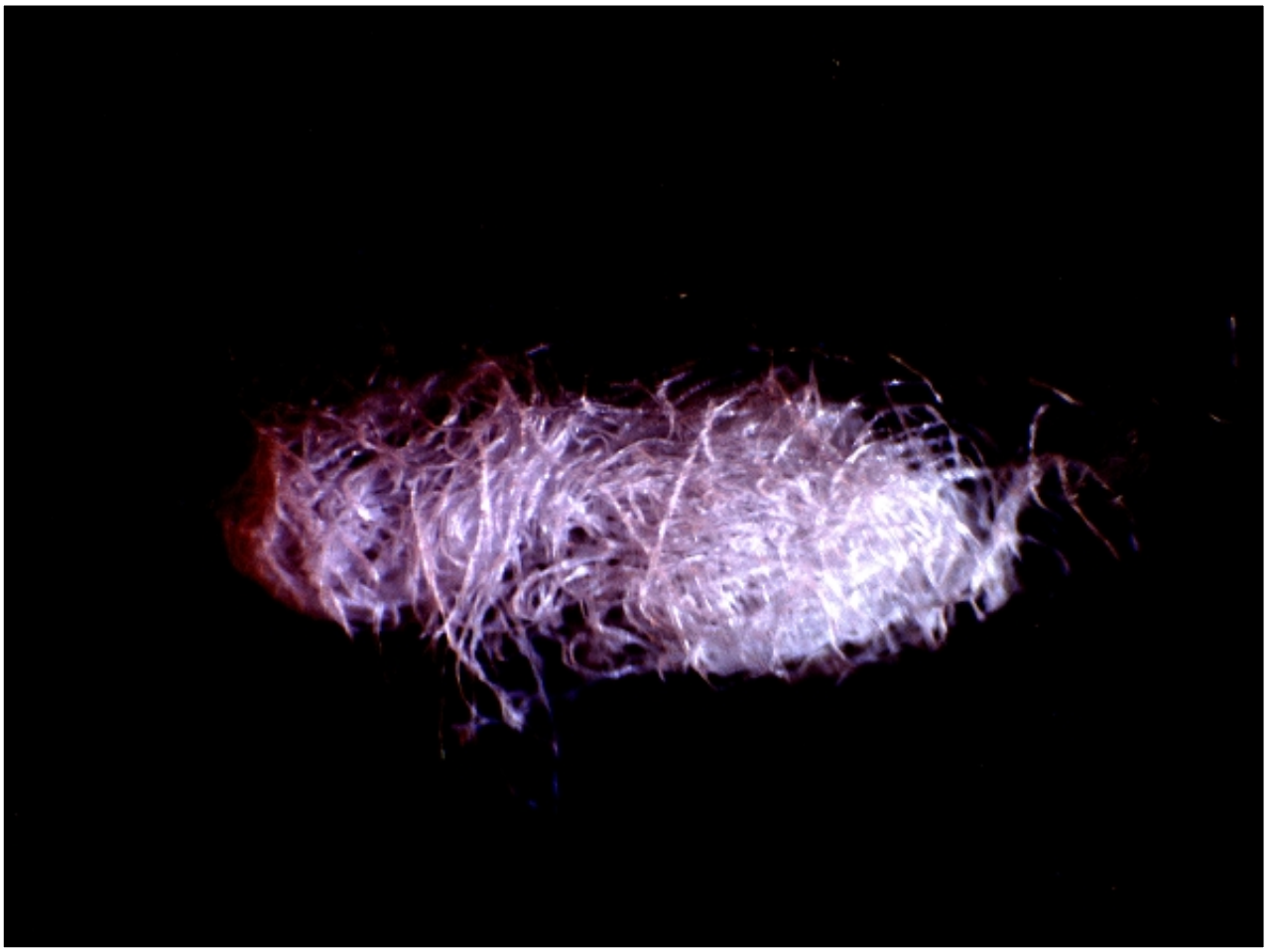
by

Clifford E Carnicom

Aug 10 2016

In an effort to provide continuing documentation of the *Morgellons* condition, the following images are provided. The magnification of the series progresses from approximately 100x to 5000x. The samples originate from the scalp of an individual and multiple examples have been provided under clean and controlled conditions. The network of filaments, although compact and dense, is completely commensurate with previous samples that have been examined over the years.

The filament networks taken from the skin of the affected individual come from a person that resides in France. Overwhelming evidence continues to mount that the source of the condition is environmental in nature, origin and distribution. This most recent example demonstrates the international scope of the this continuing and unaddressed public health issue.

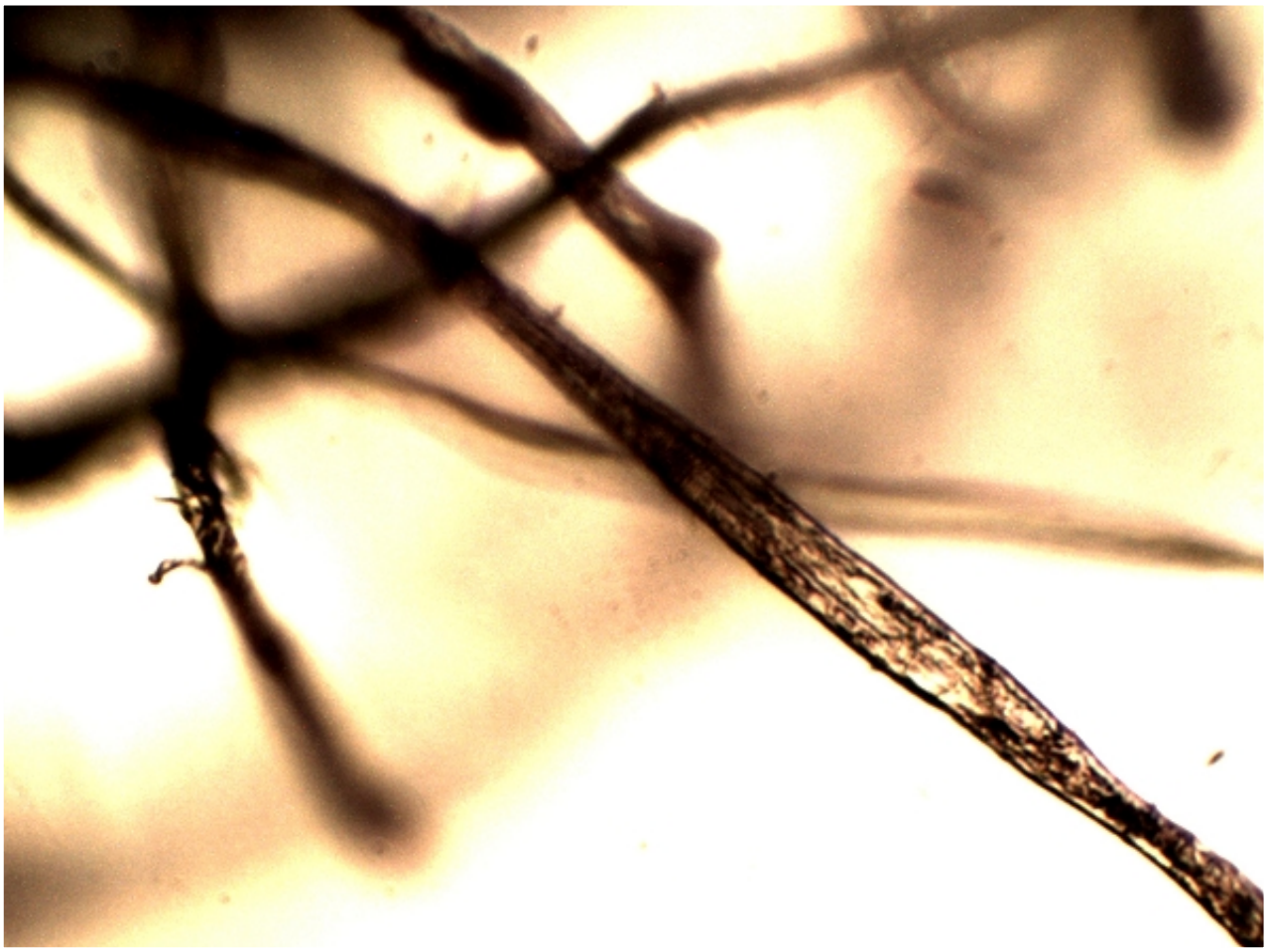


Low power image (top lit) of a representative filament network taken from the skin of the individual. The sample, in general, is difficult to image because of the density of the network. The samples measure approximately 1 mm in length. Various microscopy configurations have been used to collect these images.

Magnification approx. 100x.

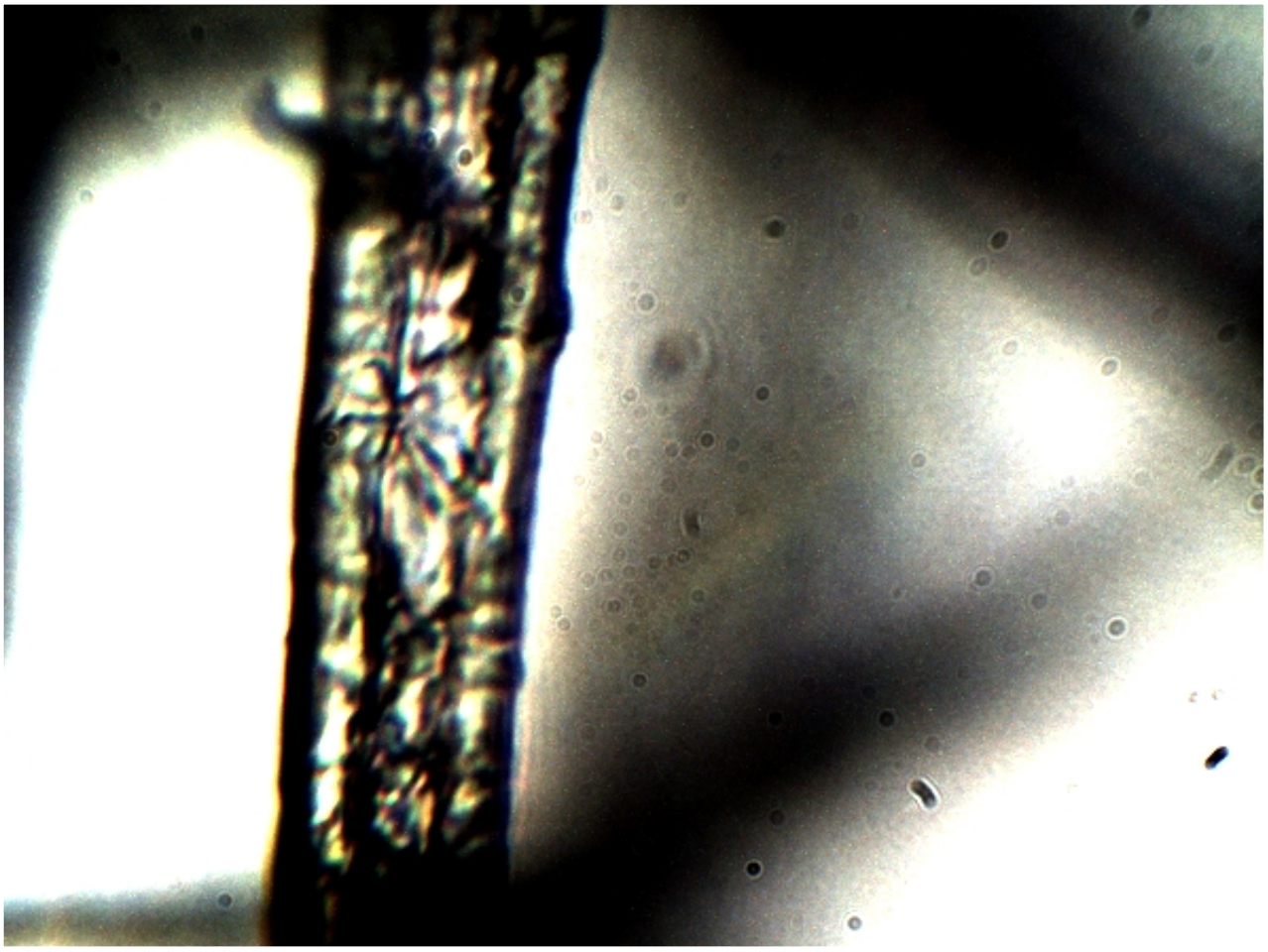
A silhouette view on the edge of the filament network.

Magnification approx. 350x.



First level of internal detail of filament network becomes visible.

Magnification approx. 1500x.



The complex internal nature of filament network is revealed. Extensive discussion on the internal structure of the filament form of growth exists on this site.

Magnification approx. 5000x.

Morgellons & Carbon Monoxide
Aug 15, 2016

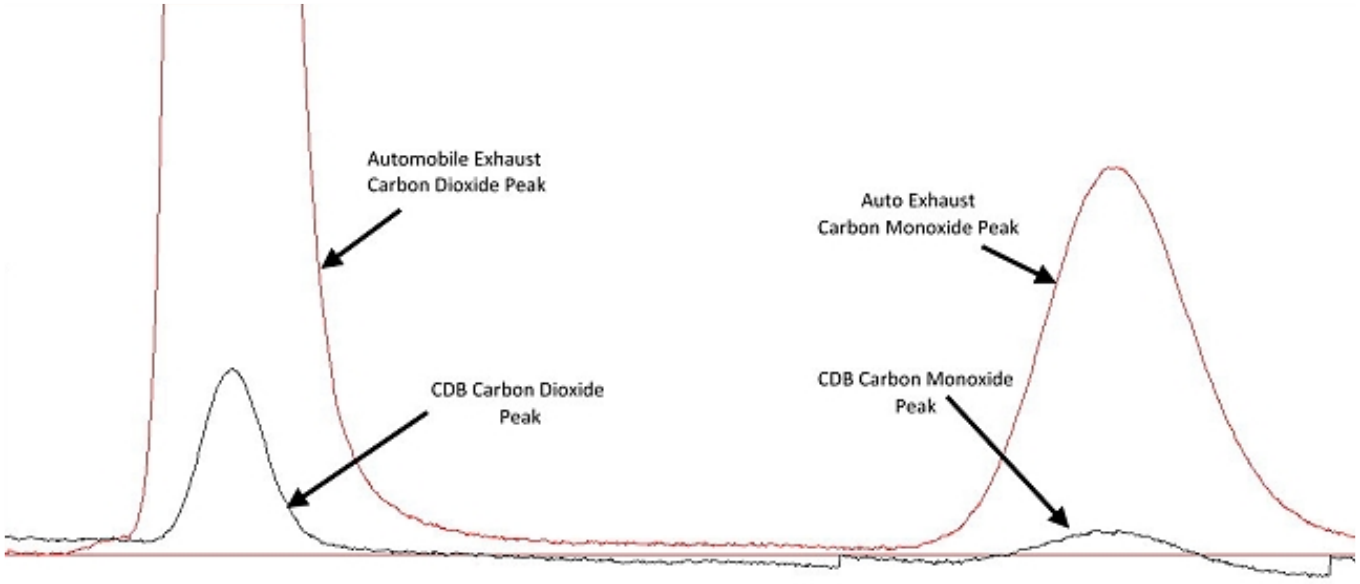
Morgellons & Carbon Monoxide

by
Clifford E Carnicom
Aug 14 2016
(To Be Continued)

Note: I am not offering any medical advice or diagnosis with the presentation of this information. I am acting solely as an independent researcher providing the results of extended observation and analysis of unusual biological conditions that are evident. Each individual must work with their own health professional to establish any appropriate course of action and any health related comments in this paper are solely for informational purposes and they are from my own perspective.

Methods have been developed that confirm the existence of carbon monoxide gas production by the microorganism identified as a source of the “Morgellons” condition. The existence of this gas as a repeatable and identifiable phenomenon from the metabolism of the microorganism poses a host of serious health implications to consider.

The presence of the gas during growth was first established and identified with the methods of gas chromatography. Carbon dioxide production is in the majority proportion and carbon monoxide accompanies this in a lower proportion, as is shown below.

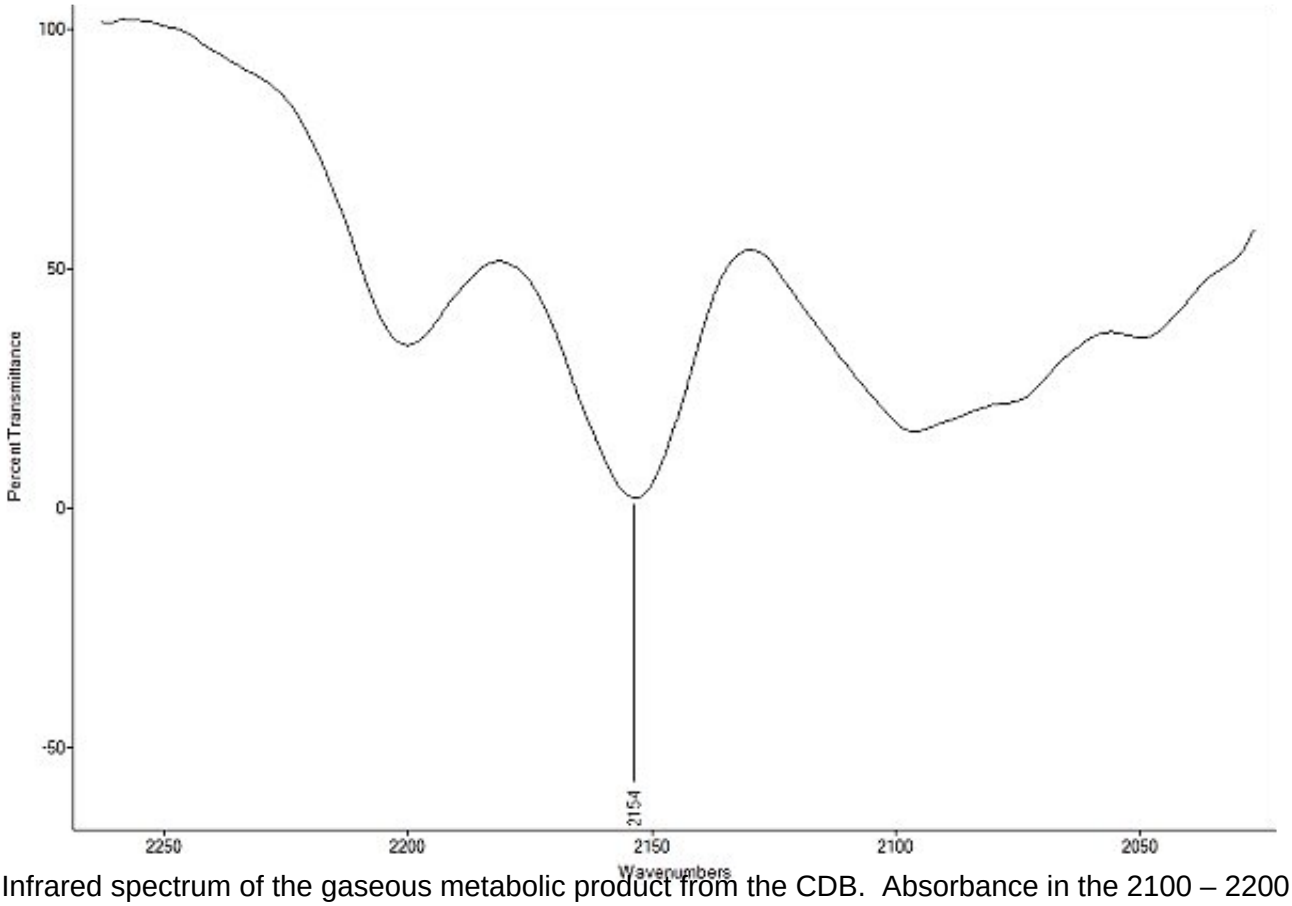


Reference gas chromatogram depicting a comparison between carbon dioxide and carbon monoxide isolated from automobile exhaust and that of the microorganism (CDB). Retention times correspond and support the identification of both carbon dioxide and carbon monoxide production.

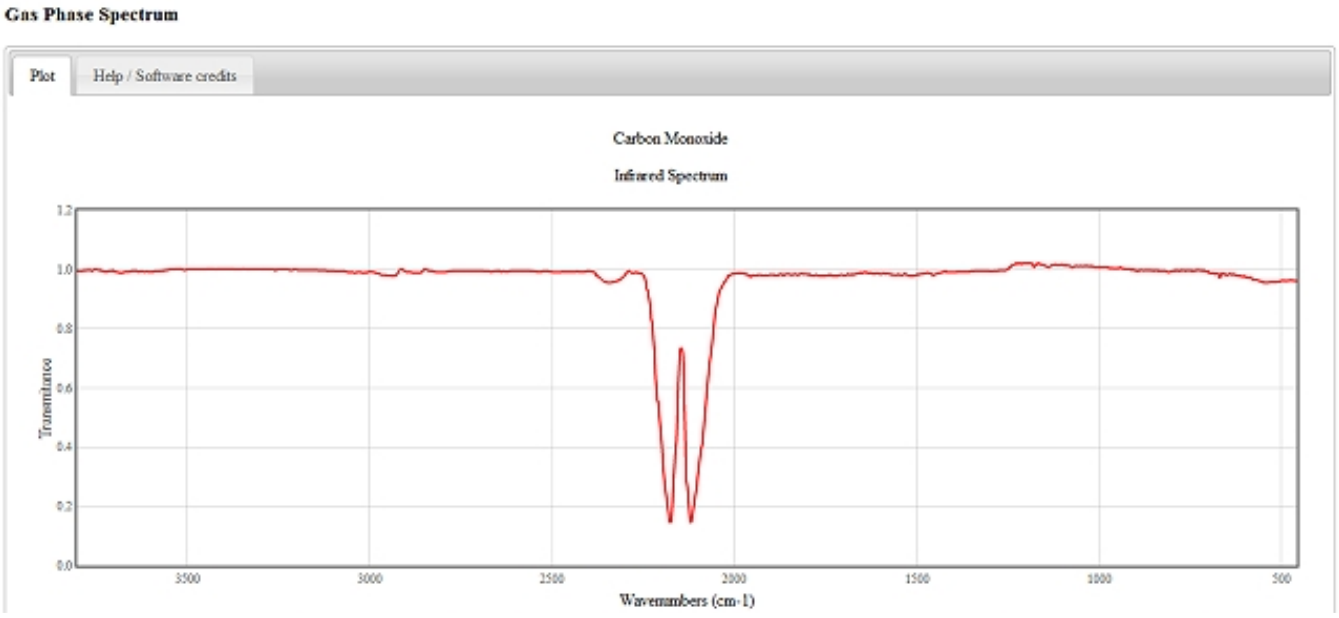
As described in previous papers, the tentative nomenclature for the microorganism has been designated

as a "*cross-domain bacteria*", or CDB. This terminology remains in place by this researcher as study continues; all evidence does continue to support the hypothesis of a predominant bacterial origin and nature.

The conclusions regarding the gas as a product of metabolism have been further confirmed with the use of infrared spectrometry. The carbon dioxide spectrum (gas) presents strong absorbance peaks in the 2100 – 2200 cm^{-1} wavenumber range. These peaks have been repeatedly identified within the gaseous samples from the CDB microorganism.



Infrared spectrum of the gaseous metabolic product from the CDB. Absorbance in the 2100 – 2200 cm^{-1} wavenumber range has been repeatedly identified, and is shown above. This absorbance in this specific infrared range further supports the conclusion of carbon monoxide production by the microorganism.



Reference spectrum of gaseous carbon monoxide. Absorbance in the 2100-2200 cm-1 wavenumber range exists as a unique identifying characteristic of the gas. Source of image : NIST

Gas chromatography and infrared spectrometry methods, applied repeatedly to multiple samples of CDB growth, both support the conclusions of carbon dioxide and carbon monoxide production reached in this report.

The concentration of carbon dioxide within the samples is relatively high and easily detected. The concentration of carbon monoxide is lower, and is at roughly the limits of detection with the instrumentation available. A first and partial estimate of the carbon monoxide concentration is on the order of 50-100 parts per million (ppm) within the sample volumes examined. The existence of continuous gas production by the CDB, irrespective of concentrations to be determined in the future, is sufficient to warrant serious health impact investigations.

Additional gaseous production, such as that from hydrocarbons, remains an additional topic of investigation and remains for future discussions.

The primary purpose of this paper is to disclose the result in preparation for future examinations. A few historical and leading comments will be made with respect to the health issues that warrant mention, but this topic is obviously deserving of its own discussion in future days.

The finding is, of course, of significance. However, for those familiar with the history of research on this site, the disclosure should not be one of total surprise. There is now a record over several years of an ongoing chronicle of reported and expected interference with major systems of the body from the Morgellons condition. This interference and damage to human health most emphatically concerns all aspects of energy production, oxygen transport, iron utilization and respiration. It has been reported on continuously for a period of many years now. What differs in the the current situation is that a primary mechanism for a portion of that harm may be under definition.

I will spare the reader of citing the legacy of work on this site that is completely and totally consistent with a finding of carbon monoxide within the metabolism of the organism; I do, however, encourage that investigation to understand the depth of work that leads us to this occasion.

The most immediate need will be a preview to some of the potential health risks from carbon monoxide in the body. I would suggest that a focal point of investigation be that of ***chronic low level exposure*** and the associated symptoms and conditions that might result. Higher concentration impacts, for a myriad of practical reasons, would not seem to be relevant at this time. Carbon monoxide and human health is serious business no matter how you choose to look at it. It will also be of interest in our future to compare the low level exposure symptoms with those that will, in due time, become known from the investigative survey (MRP) conducted by this Institute. The investigations will be complicated further by the broad array of disruptors that been brought forth in the course of the research over many years.

It will also be of interest to investigate those groups of bacteria or related microorganisms that share in the property of producing carbon monoxide, carbon dioxide, and/or various hydrocarbons within their metabolism. The commonality of that trait will also be of interest.

Let us look at the latter question first.

To Be Continued

A Response to the University of California and the Carnegie Institute
Aug 22, 2016

A Response to the University of California and the Carnegie Institute

by
Clifford E Carnicom
Aug 22 2016

Preliminary Note: A journalist of professional standing recently contacted Carnicom Institute requesting comments with respect to a recently published paper by the University of California. The paper claims to issue an authoritative edict as a denial of geoengineering activities that are now actively practiced and that are detrimental to the global environment. The following comments were provided to that journalist and they are made available to the public as follows:

The body of scientific work on geoengineering and bioengineering issues by Carnicom Institute spans close to twenty years. The library of work, approximately 350 original research papers, encompasses a variety of scientific disciplines. The methods and results, essentially with no exception, are reproducible and adhere to scientific protocols. This evidence (not survey) based work is available for your review at:

(by category):
https://carnicominstitute.org/wp/category-listing/

(chronologically):
https://carnicominstitute.org/wp/research-library-listing/

In addition, documentary summaries are available at:

(2005 full-version):
https://www.youtube.com/watch?v=31JFDGHs5bQ

(2011 abbreviated version):
https://www.youtube.com/watch?v=PPfm1ljfwkU

The remainder of this response will be necessarily brief: we can pursue further discussion later, should you choose.

Specifically, in reference to the UC “peer-review study” and the presentation on the UC website, I will make the following comments at this time:

1. The paper in no way represents honest scientific work. This is a shining example of modern “science with an agenda” as opposed to truthful scientific pursuit. The paper is characterized more accurately as an exercise in social engineering versus fulfilling the requirements of the scientific method.

2. The emphasis upon the act of “debunking,” in itself, is a prelude to a biased investigation. The term implies a strong association with an attempt to disprove, discredit, and refute claims without

fulfilling the obligations to conduct the actual research that is required to answer a question or to solve a problem.

3. The creation of the acronym “SLAP” at the onset is an obvious ruse and manipulative ploy to steer public perception toward ridicule. The term has not existed in the history of the issues and it was created specifically for the purpose above. It is an example of the many clever and subtle machinations to affect public psychology under the purported guise of professional presentation and credentials. It is a cheap ruse.

4. It is understood that most individuals will never read the actual paper at the “core” of the study. I hope that you may choose to devote some time to this effort, as well as gain some familiarity with the body of Carnicom Institute research listed above. The UC paper can, of course, be dissected to infinity; however, I will make a few individual references to exemplify pertinent topics for discussion.

Let us begin with what appears to be the motive for the study; it speaks more strongly of the desire to influence public behavior than it does to seek observational and evidence-based data to substantiate the scientific method.

“Meanwhile, a growing number of studies have shown that quantifying and communicating the scientific consensus on contested issues such as vaccine safety and climate change can help lower public misperceptions and uncertainty(Myers et al 2015, vander Linden et al 2015, van der Linden et al 2015).

Here, therefore, we report the results of an expert survey in which we asked experts on atmospheric chemistry and atmospheric deposition to scientifically evaluate the claims of SLAP theorists.”

The first assumption implicit within this statement is that for some “unknown” reason, the public is in a state of “misperception” and “uncertainty.” Why would such an assumption need to exist for the scientific method to proceed? This type of bias is a discredit to the acumen of the public. Even casual research will reveal that the concern by the public regarding the geoengineering issue is now elevated to a global level. By what right and upon what basis must we start our endeavor by assuming that this global population is ill-informed?

Notice the phrase *“Here, therefore, we report the results of an **expert** survey….”* This phrase continues the mis-advised logic from above and it states the true motive for the project. It is to “correct” the misguided ways of the global public in their *“growing public distrust of elites and social institutions.”*

The project is flawed from the beginning. It does not embody or represent the scientific method; it is not based upon direct observation, direct collection of evidence, the testing of hypothesis, and the fair and honest assessment of bonafide data to reach accurate and truthful conclusions. None of the work or research in the paper is original. This so-called “peer-review study” is an orchestrated and manipulative social engineering project; it is not science.

5. If you continue to examine the processes adopted within the *survey* (an incomplete approach, at best, to a phenomenon of global proportions), you will see the frequent repetition of the words “thought” and “likely” (NOT observation, NOT evidence) by the claimed experts. No participant offers any objective data or pursuit of resolution to eliminate this ambiguous response. A more fair and thorough response to many of the questions posed would be: What steps are being taken to acquire the data to eliminate the ambiguity? What data do I need? Who is responsible

for providing the data? How is the data audited? The *peer-review* process itself is now flawed and it does not assimilate independently (i.e. “citizen science”) acquired data, contributions, and reviews into science as it is now claimed to exist.

6. We have an additional curiosity taking place. It will be noticed on multiple occasions that unexplainable data results were apparent to the participants. Subsequently, a generally uniform response of **rejection** was avowed. The thought process of **rejection** is not adequately explained and the dismissal is substituted with an ambiguous call for “more data.”

Where is the cry and demand for the data? Not a trailing and vague ending to the most critical questions at hand, but real data, impartial data, independent data, accountable data. The lack of accountability on this global environmental issue is preposterous.

7. There are, with no doubt, weaknesses and flaws that exist in the quality and standards of control for citizen collected samples. More importantly, we should be asking the question as to why citizens are in such a position to begin with. Maybe it is because of the inadequacy of the regulatory agencies to fulfill their own responsibilities for environment protection.

8. There are many technical issues that can also be discussed within this paper. These issues are subject to serious evaluation and debate in comparison to how they have been cited as authoritative references. One example of this includes the elaborate discussion of a mixed “contrail-cirrus” mathematical model. The very basis of the model itself is open to contentious discussion. This and other topics can be discussed further by those with interest.

9. For now, let me end this brief examination with attention to a closing phrase of the paper.

*“We therefore offer the first **peer-reviewed expert** response on **SLAP** data.” … “The evidence as evaluated here does not point to a ….”*

What a perfectly loaded and crafted phrase. It is everything that the social engineers need to achieve their goals of manipulating and affecting public perception. Sarcasm aside, it is even more impressive because it is the “*first.*” This statement is a masterful conclusion of an incomplete and questionable process that avoids the hard-hitting realities and confrontations that come forth from TRUE science. Finally, I would claim that this paper does not present evidence; it present a series of ambiguous and incomplete responses to the reasonable demands from an alert and aware global population that is truly and genuinely concerned about our environment.

This is only a partial response to a purported accredited and authoritative study. My hope is that readers will pursue honesty and thoroughness in these affairs and that they will be guided by their moral conscience toward truth.

Additional Notes:

1. Having attended the University of California at the onset of my higher education pursuits approximately 45 years ago, I must say that I am embarrassed and sorry for the state of education as it now exists in this country. What was once considered to be an honor and privilege of attendance must

now be accepted with a level of disgrace to the nobler goals that were once served. I encourage each member of that institution, student, faculty and administrator, to reclaim the powers and benefits that come forth from comprehensive investigation and critical thinking to reach honest conclusions and assessments of the state of our world.

2. As of this date, the journalist referred to has not acknowledged receipt of the comments above. This statement will be revised as circumstances warrant.

Sep
Carpinteria Crystal
Sep 6, 2016

Carpinteria Crystal

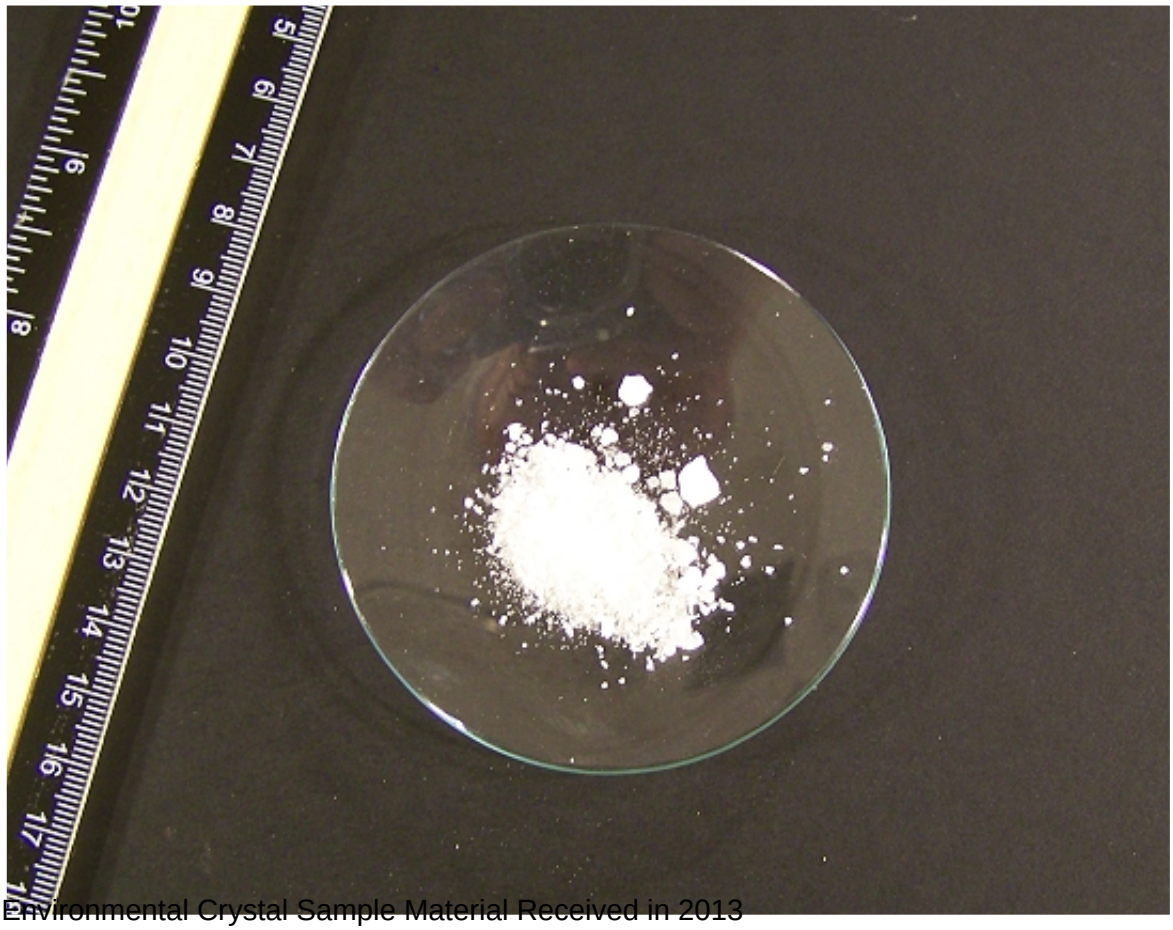
by
Clifford E Carnicom
Sep 25 2016

An environmental crystal sample sent to Carnicom Institute from a concerned citizen has been analyzed as to its nature. The ground sample was received three years ago and it has been held in custody since that time. Circumstances are now more favorable toward establishing the identity or nature of inorganic compounds, and thus the opportunity to do so in this case has been exercised. The sample originates from the Santa Barbara – Carpinteria region of the country. The sample is well documented, clean, and has been collected and transported in a careful fashion.

One of the reasons for the interest in the sample is a repetition of events. The citizen reports that similar appearing materials have occurred within the same coastal housing district on multiple occasions over a period of many years. In addition, the findings of this study may have relevance to a paper presented earlier on this site. The interest in devoting time to sample analysis is directly related to the the frequency and pattern of appearance.

There are also several occasions of crystal samples collected or received over the years that have not received proper attention due to insufficient resources and means for investigation. The majority of these cases, to my recollection, resulted from air filtration systems. These deficiencies have likely delayed our understanding of various forms of pollution that likely surround us, and this will remain the case until full and sufficient resources are devoted to these types of problems. It is the opinion of this researcher that the regulating environmental protections agencies have an obligation to this end and that it has not been well served.

This particular sample has the following appearance:



Environmental Crystal Sample Material Received in 2013

The purpose of this paper is not to debate the origin or delivery method of the sample; the information available is insufficient to fully detail those answers. It can be stated in fairness that the observer witnessed heavy aerosol operations over the region in the early hours of the day of collection of the sample. The density and activity level of the operations was stated to be high.

The purpose of this paper **IS** to call attention to what *may* be a repeating type of material that has potentially important environmental consequences, particularly if they are found to exist in aerosol or particulate form within the general atmosphere. The sample type is also fully consistent with many of the analyses and postulates that have developed within the research over the years. The specifics of that discussion will follow within this paper.

The sample has been evaluated using multiple approaches. These include, but are not limited to:

1. Electrochemistry techniques, specifically differential normal pulse voltammetry.
2. Solubility analyses
3. Melting point determination
4. Density estimates
5. Microscopic crystal analysis
6. Qualitative reagent tests
7. Conductivity measurements
8. Index of refraction measurements

The results of these analyses indicate that the dominant component of the material is that of potassium chloride, a metallic salt form. There are indications that the sample does contain more than one component, but any further investigation will have to take place at a later time. Every physical and chemical form has implications, applications and consequences, especially if they occur in a manner foreign or unexplained to the environment. The material shown above is of no exception to those concerns. It may be the case that the appearance of this material in an unexplained manner and location is of no consequence; prudence, however, would suggest that we are obligated to seek out that which has no accountable explanation. This premise is at the very heart of any forensic investigation, and environmental science and pollution control are also subject to that very same demand.

A brief bit of historical perspective on this topic could be helpful. A search on this site on the subject of crystals will bring up a minimum of eight additional papers that are relevant; there are likely to be more. These papers range in date from 2001 to the current date, so from this standpoint alone there is a repeating issue involved here.

A search on this site for historical presentation on potassium issues produces at least three papers on the subject. There is reason to consider, therefore, that potassium (and related) chemical compounds may be worthy of examination with respect to geoengineering as well as biological issues.

Within this combined set of close to a dozen or more papers on the subjects, two will be mentioned further at this time.

The first will be that of another sample, also of a crystalline nature, received in 2003 from the same specific region of the country. The title of that short report is "Additional Crystal Under Examination" (Jun 2003). There are three points of interest in comparison between that and the current report:

1. Two generally similar and unaccountable sample forms appear in similar locations over a 10 year period, and a public interest in identification of the nature of the material remains over this same prolonged period.

2. The report in 2003 is reasonably brief with a limited microscopic examination offered. The topic is mentioned more in the sense of an anomaly and a curiosity as there is no basis at the time for an in depth study of the materials; in addition, resources to do so at the time are non-existent.

3. The third will be the comment regarding the lack of water solubility of the first sample. The importance of this observation will be the fact that the samples, although visually similar, have important differing chemical properties. The conclusion is that multiple material types are expected to be subject to investigation over the course of time.

The second will be that of a laboratory report received in the year of 2005. The title of that paper is "Calcium and Potassium" (Mar. 2005). The importance and relevance of this paper can be understood from the opening paragraph:

"**A laboratory analysis of a rainwater sample from a rural location in the midwestern U.S. has been received. This lab report reveals extremely high levels of potassium and calcium within the sample. Comparative studies have been done and they show that the calcium concentration is a minimum of 5 times greater, and that the potassium level is a minimum of 15 times greater than**

that which has been reported[1] in the polluted skies of Los Angeles, California.“

It will also be noticed that several health and environmental concerns with respect to aerosolized potassium salts are enumerated in that latter paper. Attention should also be paid to the intriguing discussion of electromagnetic effects and impacts that must be considered with the chemistry of potassium and related ions.

Potassium chloride has common uses as well, such as a fertilizer or as a water treatment compound; there is, however, no cause given to think that it is being used in such fashions at this location and setting at this time.

Let us now bring ourselves back to the current moment. The relevance and direction of those papers have borne themselves out over time, and the urgency of responsibility upon us is as imposing as ever. We do not have the luxury of another 20 years to conclude on such an obvious state of affairs.

There are at least three immediate applications or consequences of the existence of aerosolized potassium chloride upon the atmosphere that should be mentioned.

1. Heat Impacts

2. Moisture Impacts

3. Electromagnetic Impacts

With respect to heat impact, potassium chloride is highly soluble within water. When it does dissolve, it absorbs heat from the water, and the magnitude is significant. Potassium chloride has actually been used as a cold pack commercially for this same reason; it is also readily available and relatively inexpensive. It therefore can potentially be used to influence atmospheric thermodynamics, and this is one of many leads of investigation to pursue.

On the flip side of the equation, potassium chloride in a solid state has a rather low specific heat, especially relative to that of both air and water. This means that, depending upon the state of the surrounding atmosphere, that it can also possess the capability to heat the atmosphere, rather than to cool it.

Furthermore, potassium as a metal in its elemental form also has a lower specific heat than air and once again this may allow for a net heating impact upon the atmosphere, depending on states of being, location and interaction with other elements or compounds.

The point of this discussion is that metallic salts *of any kind* DO have an impact upon the heating dynamics of the atmosphere, and that this process can be both complicated and variable. You cannot place anything into the atmosphere without having an effect in some fashion, and it is a mistake to oversimplify and overgeneralize as to what those changes will be. The location of placement of aerosols is another matter also, as has been discussed extensively on this site.

We are, therefore, not permitted to remain ignorant of the impacts that foreign and contaminating materials have upon the environment; heat dynamics are only one of many aspects of that we are forced to confront when the atmosphere is altered in ANY significant fashion.

There are, of course, many other environmental consequences from the addition of ionizable metallic salts into the environment. These include plant life and agriculture, for example. Readers may also wish to become familiar with a discussion regarding soil impacts as presented within the paper "The Salts of Our Soils" (May 2005).

As far as moisture is concerned, heat and moisture are obviously very closely related subjects. One of the trademarks of the salt genre is that of absorbing moisture. Some salts attract moisture so strongly that they are *hygroscopic*, meaning that they can draw moisture from the ambient atmosphere. The observation of this phenomenon is quite remarkable; one can start with a solid and watch it change to an eventual liquid form. Calcium chloride and strontium chloride are both good examples of this class of materials.

Locking moisture up in this fashion will most certainly increase the heat in the atmosphere; water is one of the greatest cooling compounds that exists on the planet. It is impossible to separate heat and moisture impacts when dealing with aerosolized metallic salts; it is certain that there will be an impact upon the atmosphere, environment and health. It is difficult to predict a favorable outcome here.

Lastly, there may still be some that will ridicule the notion of electromagnetic impacts of ionized metallic salts upon the atmosphere and the environment. I think such an approach might ultimately be foolhardy. This tenet was brought forth early in the research of this organization, and the premise remains as strong as when it is originated. For those that care to repeat the enterprise, there are measurements to support the hypothesis, and they only continue to accumulate.

For those that seek conventional sources, one need look no further than a document that traces back to the 1990's, entitled "Modeling of Positively Charged Aerosols in the Polar Summer Mesopause Region" (Rapp, Earth Planets Space 1999). A very specific reference of the ability of potassium in combination with ultraviolet light to increase the electron density of the atmosphere will be found there. There are other elements that share in this remarkable physical property, and they have been discussed within this site for many years now. Reading the patents by Bernard Eastlund may also be insightful. The ability of moisture to ionize many metallic salts is also to be included within the examinations that are required to take place.

It is difficult to ignore and discount the fundamental heat, moisture, and electromagnetic impacts upon the planet when metallic salts are artificially introduced into the atmosphere. It would not be wise to do so. The case for investigation, accountability and redress is now strong, and each of us can make the choice as to how to best proceed. It seems to be a simple matter to want to protect and ensure the welfare of our gifted home, as our existence depends upon it. Clarity and unity of purpose would seem to be an end goal here; I hope that each of us will seek it.

Regardless of the origin of this particular sample (which is unlikely to ever be known exactly), this report points to the requirement of identifying repetitive and unknown contaminants in the environment. The responsibility for this process does not fall either primarily or exclusively upon the citizens; this population has neither the resources or means to perform or satisfy the requirements of identification, evaluation and assessment. Entrusted agencies that exist specifically for protection of the welfare of the common environment (e.g., air, water, soil) and that are funded by these same citizens ARE required to do so. In this vein, I will once again repeat the closing statement from above:

Clarity and unity of purpose would seem to be an end goal here; I hope that each of us will seek it.

Clifford E Carnicom

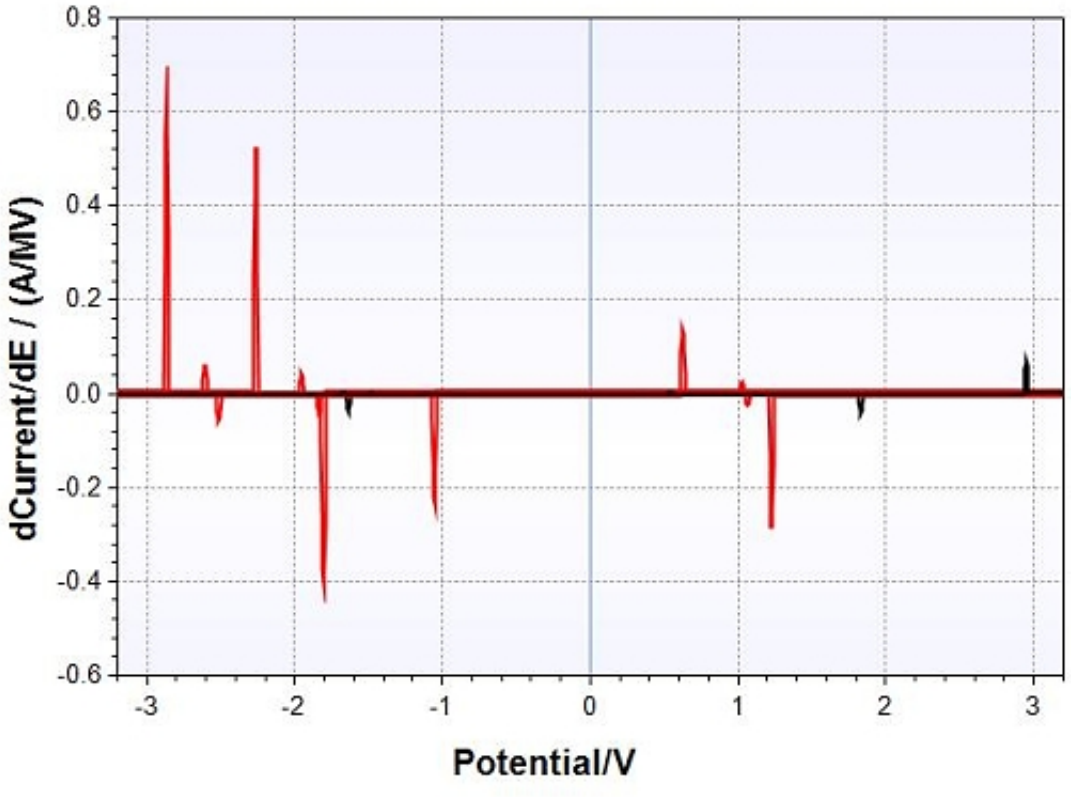
Sep 25 2016

Supplemental Discussion:

Approximately a dozen methods of investigation have been used to reach the conclusions of this report. These will now be described to a modest level of detail to assist in portraying the complexities of analyzing unknown environmental samples. This description will further the argument that the citizenry is not realistically expected to assume this burden and cost; contamination and pollution are at the heart of existence for publicly funded environmental protection agencies and entities. It is recommended that the public seek the level of accountability that is required to reduce and eliminate persistent and harmful pollution and the contamination of our common environment.

1. Voltammetry:

The methods of differential pulse voltammetry have been applied to the sample. The methods are quite useful in the detection of inorganics, especially metals and trace metal concentrations. The results of the analysis are shown below:



Differential Normal Pulse Voltammetry Analysis of Crystal Sample

The analysis indicates a minimum of two chemical species to consider. The first of these is a suspected

Group I or Group II element (-2.87V). The most probable candidates to consider will be that of calcium, strontium, barium and potassium. The other will be the consideration of the chloride ion (+0.63V and +1.23V).

At this point of the investigation, our strongest prospect will therefore be an ionic metallic salt crystalline form, most likely involving a subset of Group I or II of the periodic table. The most likely candidate will, furthermore, be a chloride form of the salt.

2. We can then proceed to solubility tests. Four candidates from above will now be considered, along with two additional candidates resulting from the chloride prospects:

calcium chloride
strontium chloride
barium chloride
potassium chloride

lithium chloride
cesium chloride

With respect to the first set of four, the solubility tests applied (i.e., water, methanol, acetone, sodium bicarbonate, acid, base) eliminate all but potassium chloride for further examination.

This reduces the primary set of consideration to that of:

potassium chloride
lithium chloride
cesium chloride

We now attempt to confirm the existence of the chloride ion in a redundant fashion. A qualitative chemical test (HCl, AgNO3) is then applied to the sample in aqueous solution. The existence of the chloride ion is confirmed. The set of three candidates remains in place.

The next method applied to the sample is the determination of the melting point of the presumed ionic crystal form. Ionic metallic salts have generally high melting points and this does present some difficulties with the use of conventional equipment and means.

The methods of calorimetry were adapted to solve this particular problem. The methods were also applied to a control sample of potassium chloride, as well as two additional control compounds. The results of the control and calibration trials produced results within the range of expected error (~ < 5%).

The melting point of the crystal form was determined experimentally by the above methods as approximately 780 deg. C. The melting point of potassium chloride is 770 deg. C. This result is well within the range of expected experimental error (1.4%). During the process, it was noticed that an additional minority compound does exist within the sample, as a small portion of the sample does melt at a much lower point (est. 300-400 deg. C.) The minority compound would require separation and identification in a further analysis.

The melting points of lithium chloride and cesium chloride are 605 deg. C. and 645 deg. C., respectively, and they are thus eliminated from further consideration.

These results narrow the list of candidates specifically to that of potassium chloride.

An additional controlled test of conductivity of the salt in solution was applied. The result of that test indicates agreement in conductivity with a known concentration solution of potassium chloride. The error in that case was also well within the expected range of experimental error (0.6%).

In addition, further tests involving density determination, index of refraction, visual and microscopic crystal analysis further substantiate the identification of the crystal as being primarily that of potassium chloride.

Nov

Morgellons Research Project : Primary Symptom Survey Results

Nov 5, 2016

Morgellons Research Project : Phase I

Primary Symptom Survey Results

by
Clifford E Carnicom
Nov 05 2016

Note: Carnicom Institute is not offering any medical advice or diagnosis with the presentation of this information. CI is acting solely as an independent research entity that is providing the results of extended observation and analysis of unusual biological conditions that are evident. Each individual must work with their own health professional to establish any appropriate course of action and any health related comments in this paper are solely for informational purposes.

To access the survey results in their entirety, please visit the the following page:

MRP SYMPTOM SURVEY RESULT

The following list comprises the top 20th percentile of symptoms that have been compiled in Phase I of the Carnicom Institute Morgellons Research Project survey that has recently completed. The online survey operated on this site for approximately one year and includes the results of approximately 1000 individuals. Both short and long version survey results were collected. The information below is a high level summary and it represents only a small portion of the data that is available via the Institute.

PRIMARY SURVEY SYMPTOM RESULTS

(Top 20th Percentile):
NO MEDICAL CLAIMS BEING MADE – SURVEY ONLY.

1. Materials or substances emerging from skin

2. Open and/or slow healing lesions

3. Rashes or other skin conditions

4. Itchy scalp

5. Change in the quality of vision (e.g., blurry or fatigued)

6. Unusual & chronic ringing in the ears

7. Unusual dental conditions

8. FATIGUE (6 overlapping sections of survey)

9. Shortness of breath, persistent or excess mucus or sputum

10. Stiffness in joints

11. Constipation, bloating, unusual weight gain

12. Anxiety, nervousness, irritability

13. Headaches, dry eyes & mouth

14. Forget events

15. Reliance on external memory aids (calendar, notes)

16. Loss of train of thought or flow of thread of conversations

17. Difficulty diagnosing, identifying or explaining the illness

18. Skin problems

19. Associated conditions (diagnosed or examined) :

a. Lyme Disease

b. Chronic Fatigue

c. Herpes

Dec

The Magnitude of Morgellons

Dec 6, 2016

The Magnitude of Morgellons

by
Clifford E Carnicom
Dec 06 2016

Note: Carnicom Institute is not offering any medical advice or diagnosis with the presentation of this information. CI is acting solely as an independent research entity that is providing the results of extended observation and analysis of unusual biological conditions that are evident. Each individual must work with their own health professional to establish any appropriate course of action and any health related comments in this paper are solely for informational purposes.

It must now be accepted by the global community that the “Morgellons” condition exists as a verifiable pathological condition. An objective online extensive health survey conducted by Carnicom Institute during this past year involving approximately 1000 participants, with significant international representation, substantiates this claim. The survey clearly reveals and establishes that the health effects from the Morgellons condition are commensurate and on par with the global influences of such widespread conditions as Lyme’s disease and Chronic Fatigue Syndrome. The demographics of the survey demonstrate a reasonably broad and representative segment of the population. The symptoms are unique, real, physical, complex, and verifiable. Any measures or campaign to portray the situation as other than above are disingenuous and they are not confronting of the facts or extensive evidence on record. It will be to the benefit of society when such realities are accepted in good order, and the measures taken to reduce or eliminate the unnecessary suffering that is in place.

A high-level summary of primary symptoms tabulated within the survey is available as follows:

Morgellons Research Project : Phase I
Primary Symptom Survey Results

A more detailed presentation of the survey results is available as follows:

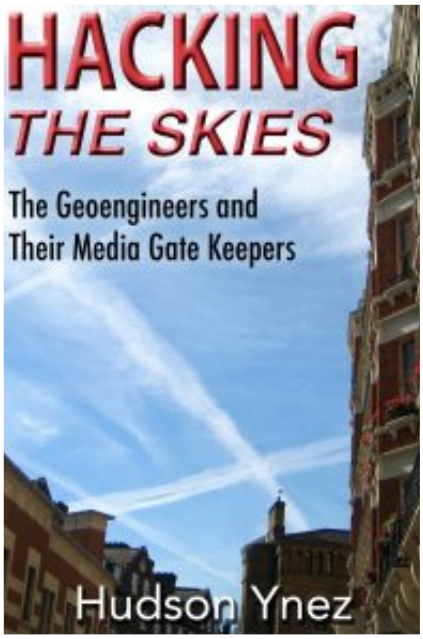
Morgellons Research Project : Phase I
Symptom Survey Results

The summary presentations above represent only a segment of information collected under the auspices of the survey.

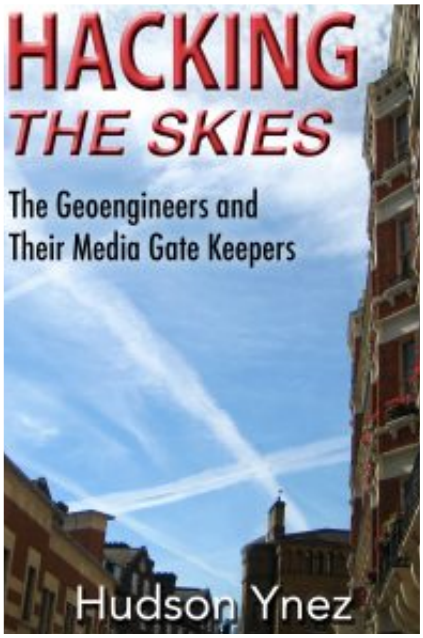
Preview Chapter - Hacking the Skies

Dec 16, 2016

On the 40th Anniversary of the Movie "Network",
Presenting a Book Preview & Chapter Download **from:Hacking the Skies:**
"Seeking the Truth – Introducing the Carnicom Institute**"**
by Hudson Ynez Free PDF Download of the Chapter
Click Here to Download



Also on Amazon
(Note : Free Kindle app for Iphone, PC, Mac, & Android here)
and also:
on Smashwords
(numerous formats available)



(A preview of the book is also available on Amazon & Smashwords at no cost.

A portion of the proceeds from sales of the book will be donated to Carnicom Institute)

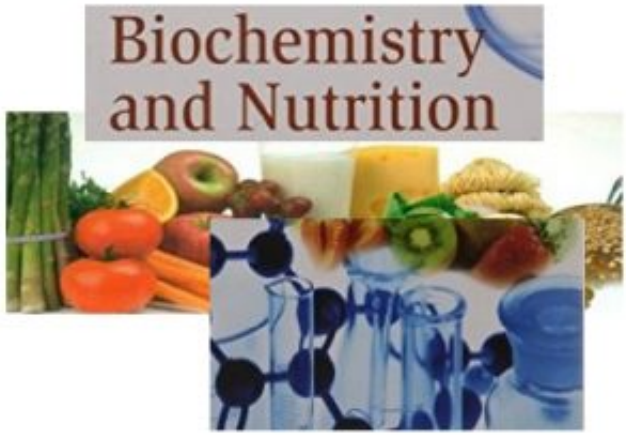
Morgellons : A Supplemental Discussion

Dec 30, 2016

Morgellons : A Supplemental Discussion

by
Clifford E Carnicom
Jan 21 2017
Edited Mar 08 2017
Edited Jul 03 2017
Edited Aug 13 2017
Edited Oct 16 2017
Edited Oct 29 2017
Edited Aug 18 2019

Note: Carnicom Institute is not offering any medical advice or diagnosis with the presentation of this information. CI is acting solely as an independent research entity that is providing the results of extended observation and analysis of unusual biological conditions that are evident. Each individual must work with their own health professional to establish any appropriate course of action and any health related comments in this paper are solely for informational purposes.



This paper will bring forth a series of additional health related suggestions and topics for further research with respect to the “Morgellons” condition. The emphasis will be upon specific nutritional or therapeutic supplements that may be worthy of additional study and investigation by the health communities and professions, and how these may relate to the symptoms expressed within the condition. *It is important to mention that each of the items or topics mentioned results directly or indirectly from the laboratory research that has taken place at the Institute over a period of several years*. The details of that research will be too complex to elaborate on here, but the nutritional and supplement topics will at least be brought forth to the public for investigation and discussion.

There are three prerequisites for engaging further with the content of this paper:

The first is to be familiar with correspondence that has been delivered to a variety of individuals that have contacted the Institute over a period of several years on the Morgellons issue. This correspondence follows immediately below.

Greetings from CI,Thank you for writing to Carnicom Institute about your health situation.

Stage I of the Morgellons Research Project, the online health survey, is now complete. A vast storehouse of information for health professionals is now available. Base results are posted on the website. In addition, CI has taken the initial steps in developing a public platform to network health practitioners and the public. To learn more about the Community Health Professional Network,

CARNICOM INSTITUTE
COMMUNITY HEALTH PROFESSIONAL NETWORK

We recommend that you visit our website and read Clifford's papers relevant to the Morgellons condition. Carnicom Institute cannot give out medical advice, but there is much to be gleaned from the research that may be of benefit. With this in mind, here are some suggested research papers to study:

Numbers 14, 15 and 17 on this paper (Morgellons : A Thesis) – especially No. 17.

Also study anything you see related to iron and amino acids, for example: Amino Acids Verified
(The first paragraph may be helpful to study.)

Please find and review"Carol's Smoothie" on the Media Resources Page, and the external link with a focus on nutrition; proper nutrition has a direct relationship to the research that has been presented.

We have a search box on the site at the top of the research listing at:

Search for anything written related to iron, protein, amino acids, glutathione, NAC, antioxidants, vitamins A, B, C, D,E, across the board, enzymes, gelatin, oxidation of the body (smoking would seem to be a serious and undesirable complication of matters), collagen, liver, and detox. Reading about them could offer insights into their role in maintaining health.

Listen to Mark Kilcoyne's webinar with Mr. Carnicom.

Please see the recent paper (Morgellons : A Working Hypothesis) particularly the third section on mitigating strategies. Pay special attention the thyroid, metabolism, and halogen substitution on the thyroid and iodine are discussed.

We recommend that you watch Clifford's youtube videos with the late Dr. Gwen Scott, naturopathic doctor. She refers to several treatments that may be helpful. There is also a paper from her on our site in the research papers section that presents a series of suggestions on the subject.

Although there have been several important discoveries in recent months, the recommendations here represent a substantial body of research that may be of benefit.

Carnicom Institute

[2] The second is to be familiar with **ALL** of the health related research of Carnicom Institute as it has been presented on this site.

[3] The third requirement is to be familiar with and knowledgeable of the results of the Carnicom Institute Morgellons Symptom Survey results. This database contains information from approximately 1000 participants from across the globe over a one year period, and it is readily available (including a summary report) on this site. It will be of continuing interest to correlate the results of that survey with research conducted by Carnicom Institute and others, as well as with the activity that manifests within the CI Community Health Professional Network (CHPN).

CARNICOM INSTITUTE
MORGELLONS RESEARCH PROJECT:

PRIMARY SYMPTOM SURVEY RESULT
(Summary Report)

MRP SYMPTOM SURVEY RESULT
(18 Sections)

CARNICOM INSTITUTE
COMMUNITY HEALTH PROFESSIONAL NETWORK

Only with these three requirements being met can the information that follows be understood in its proper context. Mention of any supplement does not mean that one automatically begins just 'taking a supplement'. The reason that the health disciplines and the health professionals (including, I might add, the nutritionists) exist is so that we can learn from them and that we can be helped. Too little information and understanding can often be as damaging as total ignorance, as difficult as that may be to realize at times. As I have mentioned, it is not appropriate to expect any 'silver bullets' from Carnicom Institute with respect to health discussions; the issues are complex and they can pose additional risks if they are oversimplified. The Carnicom Institute Community Health Professional Network (CHPN) has been established as an offering for a reason; it is to stimulate the professional discussion which must now take place. It is the purpose here to raise topics and questions that deserve study; it is not to establish premature conclusions on issues that are only slowly coming to light.

That being said, with all of the caveats and prerequisites made clear, let us compile a list. If an item exists on the list, it means that an interest in the topic or subject evolved from various avenues and methods of research over a period of recent years. It also may well have some bearing on the health implications and impacts from the Morgellons condition; time and proper study will eventually resolve that case. "Taking" a particular supplement is not the business at hand here, but the role of that particular supplement with respect to human health and nutrition is. Again, as always, each individual is responsible for consulting the health professional or consultant of their choice to reach decisions about their own particular situation and needs. Carnicom Institute is not in that business, but there is tremendous interest here in the role that these supplements assume in human health, both to deficiency and excess for that matter. The role of the nutritionist will become increasingly important as the proper studies take place; this list is simply an offering on the table of particulars that may have a disproportionate influence or bearing on the Morgellons condition, in particular. This is all in addition to the prerequisites stated above, and this combined pool of analysis should provide some suitable fodder for developing strategies in the future.

Therefore, the *supplemental*, "Supplement" List:

[1] Any of the supplements that are known to improve bone, joint, and cartilage functions. This includes supplements such as glucosamine, MSM, hyaluronic acid, collagen, gelatin, and the like.

[2] Supplements which improve skin, nail and hair functions, such as biotin and collagen.

[3] The immensely important role of antioxidants and their precursors (e.g., vitamin C, NAC, alpha lipoic acid, glutathione, etc.) will not be repeated in depth here, but it will be mentioned. It will be remiss to neglect the extensive discussions on this topic that have taken place.

[4] The role and importance of the B vitamins in human health. There are particular interests in B-2 and B-12 that are at the investigative level. Neural aberrations are also a topic of study here. There are variations in the composition of B-2 and B-12 vitamins as they are commonly sold, and the issues of bioavailability and cyanide complexes also become important here.

[5] The role of enzymes with respect to essentially every biochemical reaction that takes place. The decline in enzyme production as it relates to aging is also a highly worthy topic. Examples here include betaine hydrochloride, pancreatin, amylase, protease and bromelain.

[6] The importance of probiotics, such as Lactobacilli and Bifidobacteria, in the digestive process, and also the decrease in effectiveness of digestion as it relates to aging.

[7] The benefits from the natural Omega-3 fatty acids can include, as a partial listing, triglyceride fat reduction (e.g., blood, liver), reduction of stress, anxiety and depression, lowering pain from arthritis, and joint pain, brain and cognitive function, and alleviation of some skin conditions. Additional benefits are stated as well, such as benefits to vision and lowering the risk of heart disease. There are some important chemical differences between some synthetically produced and natural fish oils; it is prudent to be aware of these differences as they did come to light within the research processes.

[8] Coenzyme Q-10 and its role with respect to cognitive, neural and brain function.

[9] Calcium D-Glucarate, and the role that it may have with the reduction or removal of polymer and/or plastic toxins within the body. This form of toxicity is also of broad based environmental concern with respect to health, and it presents especial difficulties with regard to lever toxicity. BPA toxicity is also a related topic here. Enlarged livers and increased adipose tissue appear to be prevalent within modern society. Removal of such compounds from the body is especially difficult, and it would seem to be an area of research in great need.

[10] The role of phosphorus and the effects from its deficiency in the body is an interesting topic of research. The primary question that arises here is that deficiency is not normally supposed to occur; any normal diet is apparently sufficient to alleviate this concern. The symptoms of deficiency are, however, of great interest here, especially as they relate to bones, teeth and neural functions. There are important interactions and relationships between calcium and phosphorus absorption. There is interference to phosphorus absorption in the human body from certain aluminum compounds. It is also fair to mention here that phosphorus is highly important to bacterial cell membrane structure (phospholipids) as well as DNA production.

[11] The role of the citrate ion is an intriguing and additional topic of research with respect to microbial metabolism. Citrate ion complexes are commonly available in various forms, such as those joined with either sodium, potassium and magnesium, for example. The solubility of various citrate complexes, in both water and with pH variability, is to be considered. The balances and risks of both excess and

deficiencies of these various electrolytes and ions in the body is a serious topic of medical and health science, and they are not to be ignored within this research.

[12] Aromatic therapies may also play an important role in our study of this condition. There are certainly a host of respiratory symptoms that have made themselves known in association with Morgellons. This is a broad field of study to pursue, along with all the potential health benefits from the essential oils (and the 6000 year history, chemistry and science that accompanies it). A simple and immediate interest exists with the use of tea tree oil (Melaleuca alternifolia) for potential therapeutic purposes. All essential oils have potential relevance to this topic of health research.

[13] Valerian root is well known to have potential benefits with respect to anxiety, blood pressure, sleep issues, and stress management. This natural sedative may be of additional benefit in the research that lies before us.

[14] The role of vitamins in general, and their known role as antioxidants.

[15] The existence of nitrites in urine samples represents another potential topic of investigation and research; only preliminary indications of interest exist here. Should this topic develop further, the role of cranberries and cranberry supplements with respect to urinary tract investigations (UTI) will be examined. Various potential urinary markers are a current topic of interest. The relationships between nitrite existence, the oxidation of iron from the ferrous to the ferric state, methemoglobin and carbon monoxide toxicity are to explored further (via *Harrison's Internal Medicine*, 16th edition, pp. 598-600). The studies on the alteration of iron states in connection with the Morgellons condition have been extensively discussed on this site, and the connections mentioned above are deserving of special attention in the research.

[16] Electrolyte balances are to be maintained. Electrolytes are at the core of current flow within the human body and they are required in balance for proper cell functioning.

[17] There is interest as to whether the lymphatic system will serve as an additional symptom marker for the detection of inflammation caused by the microbial source of Morgellons. The lymphatic system serves three primary roles: a) the filtration of harmful microorganisms, b) the absorption and transport of fats and lipids and c)the drainage of excess fluids from the body tissues. Overloading of the lymphatic system is expected to produce observable symptoms that are consistent with microbial infections and lipid excess and imbalance. The high prevalence of enlarged livers and excess fatty tissue within the liver may well relate here.

[18] With respect to the male gender, there is an interest in the relationships that exist between prostate enlargement, microbial nitrite production, and urinary tract infections. Prostrate enlargement is especially common with aging males, and this appears to be a complicating factor in hindering the removal of microbial toxins and the microbial organism itself from the body. This issue also may tie in directly to overloads presented to the lymphatic system by excessive bacterial growth, i.e., bacterial and urinary tract infections. It has long been stated here that skin manifestations are only one outward symptom of the Morgellons condition; the assaults are numerous and certainly belong within internal physiology as much or more than dermatology. If it is perceived that these factors may be affecting an individual, it may well be wise to evaluate the benefits of high quality and comprehensive prostate size reduction supplements. The issues of microbial growth, urinary tract infections, and lymphatic overload apply equally, however, to both male and female genders. The presence of excess nitrites coupled with the absence of lymphoyctes may eventually become one important bio-marker of the condition; this remains to be determined with certainty.

[19] Although only exploratory at this stage, there may be benefit found from the investigation of ultrasound therapies as they might be applied toward this specific microbial growth reduction. It is well known within microbiology that sonification is an effective method of microbial cell and membrane disruption; it is also accepted that ultrasound treatment is one of the safer therapies used in the health field for a myriad of applications. This course of thought is offered to the health communities and professionals for their consideration. Investigation of lymphatic overload and stress conditions may be one line of opening research here. It has certainly been an observed fact that the inherent energies of both laser and ultrasound have produced a physical response (i.e, movement in vivo), apparently from this same microorganism.

Additional note Oct 16 2017:

The role of ultrasound as a potential mitigation or reduction strategy continues to be of high interest within the research. The development of controlled trials and the support for that process remains as a strong suggestion for the health communities.

[20] The use of a well-rounded probiotic multi-enzyme formula (e.g., calcium, phosphorus, betaine HCl, pancreatin, amylase, protease, bromelain, papain, pepsin, ox bile, lipase, cellulase, lactobacillus acidphilus) *may* have benefit in the decomposition, denaturation, precipitation or removal of certain protein formations by the microorganism within the body. Separation of the influence of the various constituents above must be reserved for later and additional research. It is observed that different enzyme formulations produce variable effects of denaturation (i.e., precipitation in this case) or decomposition into the component amino acids. In either case, it is clear that enzymes can and will produce major changes in the structures of proteins; this change is anticipated to have potential benefits in the case of an unwelcome protein within the body. The interaction of variable enzymes with varying proteins (esp. the protein under immediate study) is obviously a rich topic of research for the future.

[21] The topic of thiocyanates and their toxicity continues to develop as a highly important topic of research. Their presence within numerous organic analyses than span a variety of sample types and environments is irresponsible to ignore at this point. Please refer to the paper entitled “A Point of Reckoning – Part III” (Oct 06 2017) for additional information on this subject.

Isothiocyanates can assume important roles within joint issues, thyroid problems, and mineral uptake as related to human health. These same issues certainly now present themselves at the forefront of the Morgellons research at CI as well. It would be foolhardy to ignore the level of correspondence between laboratory study and symptom reports that now exists.

Previous mention has been on this paper regarding the role that ***bioavailable*** forms of vitamin B-12 may play in the reduction of thiocyanate toxicity. This strategy is now of heightened interest as the result of the more recent, comprehensive, and expanding research. This topic remains as a suggested and further emphasized topic of investigation for the health communities.

[22] On a more general note, not yet definitively known to be related to the CI Morgellons research, the significant deficiency of vitamin D within the overall population seems to be very well established. This issue has been called to my attention via a recent conversation with a medical doctor where it was casually mentioned that this situation is affecting up to 80% of the general population. Verifying that statement has not been difficult; for example, a Scientific American article as far back as Mar of 2009 places the level at 75% at that time. The situation has deteriorated quite rapidly within a couple of decades and is not explained as to its cause.

Vitamin D deficiencies are associated with a broad array of illnesses and health conditions, including cancer, obesity, autism, heart disease, Alzheimer's disease, osteoporosis, joint conditions, and periodontal disease; this is only a partial listing of ailments within a broader list. It should be of no surprise that vitamin D deficiency study should also be incorporated into the Morgellon's research of the future; the fact that vitamin D3 is a fat soluble vitamin already provides cause for investigation into the relationship between a deficiency and the impact upon the liver from the Morgellon's conditon.

It is recommended that readers investigate the more bioavailable forms of vitamin D, such as vitamin D3. The dosage levels that are reported as beneficial vs. the minimum recommended levels are also a worthy topic to examine. Recommended levels by the National Institutes of Health (NIH) are currently on the order of 600 I.U.; bioavailable supplement forms of D3 are commonly available at 5000 I.U. These differences, with respect to bioavailabilty and dosage, undoubtedly are major issues to consider in the deficiency question.

[23] It can also be mentioned that the well known reference book, *Prescription for Nutritional Healing*, Phyllis Blanch CNC, contains an important section on immune system support. The list of supplements mentioned therein is undoubtedly of potential benefiIt as well within this discussion. The book is deserving of a general recommendation as well, as it represents a wealth of valuable health information.

[24] It is to be understood that toxicity can occur from any supplements or food consumed in inappropriate amounts; each individual is responsible for seeking counsel from the health practitioner of their choice.

[25] I anticipate easily up to a couple of dozen physical symptom, biochemical, and microbial markers of the Morgellons condition to be evident and apparent as the work in place is properly reviewed, evaluated, and utilized.

The list above is not intended to be complete or dogmatic; it never can be as human health is far too complex for such presumptions. In addition to the prerequisites stated, however, hopefully it can provide some leads of investigation and research for the future. All mentions above are of an investigative nature, however, and each of them has some basis of scientific study over a period of many years within Carnicom Institute. Please attend to all caveats, seek the the involvement of the professional health community, and may we all move forward and work together to improve our future health and humanity.

Sincerely,

Clifford E Carnicom

(Born Clifford Bruce Stewart, Jan 19 1953)