"When They Drop the Atomic Bomb" by Jackie Doll and his …

Neutron bomb is out now on iTunes, Amazon, Vimeo and G…

11 May 2023 Russian State TV Channel 1 nuclear testing a…

Russian State TV nuclear war propaganda 7 April 2023

Russian State TV Belarus tactical nukes are to be used against

Russian State TV Channel 1 arguing for use of nuclear weapon

***ABOVE (VIDEO CLIP):*** **Russian State TV Channel 1 war enabler, NOT MERELY MAKING "INCREDIBLE BLUFF THREATS THAT WE MUST ALL LAUGH AT AND IGNORE LIKE DR GOEBBELS THREATS TO GAS JEWS AND START A WORLD WAR" AS ALMOST ALL THE BBC SCHOOL OF "JOURNALISM" (to which we don't exactly belong!) LIARS CLAIM, but instead preparing Russians *mentally* for nuclear war (they already have nuclear shelters and a new Putin-era tactical nuclear war civil defense manual from 2014, linked and discussed in blog posts on the archive above), arguing for use of nuclear weapons in Ukraine war in 2023: "We should not be afraid of what it is unnecessary to be afraid of. We need to win. That is all. We have to achieve this with the means we have, with the weapons we have. I would like to remind you that a nuclear weapon is not just a bomb; it is the heritage of the whole Russian people, suffered through the hardest times. It is our heritage. And we have the right to use it to defend our homeland [*does he mean the liberated components of the USSR that gained freedom in 1992?*]. Changing the [nuclear use] doctrine is just a piece of paper, but it is worth making a decision."**

Russian state TV nuclear war threats - May 2023 round up

***THIS IS NOT ENGLISH LANGUAGE "PROPAGANDA" SOLELY ADDRESSED AS A "BLUFF" TO UK AND USA GOV BIGOTED CHARLATANS (those who have framed photos of hitler, stalin, chamberlain, baldwin, lloyd george, eisenhower, et al., on their office walls), BUT ADDRESSED AT MAKING RUSSIAN FOLK PARTY TO THE NEED FOR PUTIN TO START A THIRD WORLD WAR! Duh!!!!! SURE, PUTIN COULD PRESS THE BUTTON NOW, BUT THAT IS NOT THE RUSSIAN WAY, ANY MORE THAN HITLER SET OFF WWII BY DIRECTLY BOMBING LONDON! HE DIDN'T. THESE PEOPLE WANT TO CONTROL HISTORY, TO GO DOWN THE NEXT "PUTIN THE GREAT". THEY WANT TO GET THEIR PEOPLE, AND CHINA, NORTH KOREA, IRAN, ET Al. AS ALLIES, BY APPEARING TO BE DEFENDING RATIONALITY AND LIBERTY AGAINST WAR MONGERING WESTERN IMPERIALISM. For the KGB mindset here,***

***please read Chapman Pincher's book "The Secret offensive" and Paul Mercer's "Peace of the Dead - The Truth Behind the Nuclear Disarmers".*** **Cheers!**

War was a certainty not an option alongside peace for Hitler du

***PLEASE BEAR WITH US - THIS SITE WAS DEVELOPED IN 2006 BEFORE GOOGLE SMARTPHONE BOT CACHING (GOOGLE BOTS CAN'T INDEX THIS FORMAT ANYMORE AS IT IS SIMPLY UNSUITABLE TO SMARTPHONES WHICH DIDN'T EXIST BACK IN 2006 - WILL MOVE TO A NEW DOMAIN SOON TO OVERCOME THIS. (HOPEFULLY THE TEXT WILL ALSO BE EDITED AND RE-WRITTEN TO TAKE OUT TYPING ERRORS AND DEAD LINKS DATING BACK TO 2006 WHEN THE BLOG BEGAN - A LOT HAS CHANGED SINCE THEN!)***

Nuclear disarmers murder millions in many unnecessary wars

**Glasstone's Effects of Nuclear Weapons exaggerations completely undermine credible deterrence of war: Glasstone exaggerates urban "strategic" nuclear weapons effects by using effects data taken from unobstructed terrain (without the concrete jungle shielding of blast winds and radiation by cities!), and omits the most vital uses and most vital effects of nuclear weapons: to DETER world war credibly by negating the concentrations of force used to invade Belgium, 1914 (thus WWI) and Poland (WWII). The facts from Hiroshima and Nagasaki for the shielding of blast and radiation effects by modern concrete buildings in the credible nuclear deterrence of invasions (click here for data) which - unlike the countervalue drivel that failed to prevent WW2 costing millions of human lives - worked in the Cold War despite the Western media's obsession with treating as Gospel truth the lying anti-nuclear propaganda from Russia's World Peace Council and its allies (intended to make the West disarm to allow Russian invasions without opposition, as worked in Ukraine recently)! If we have credible W54's and W79's tactical nukes to deter invasions as used to Cold War, pro Russian World Peace Council inspired propaganda says: "if you use those, we'll bomb your cities",** ***but they can bomb our cities with nuclear if we use conventional weapons, or even if we fart, if they want - we don't actually control what thugs in dictatorships - it is like saying Hitler had 12,000 tons of tabun nerve agent by 1945, so lying we had to surrender for fear of it.*** **Actually, he had to blow his brains out because he had an incredible deterrent, as retaliation risk plus defence (masks) negated it!**

Russian nuclear weapons propaganda lies debunked as evil lik

**Credible deterrence necessitates simple, effective protection against concentrated and dispersed invasions and bombing. The facts can debunk massively inaccurate, deliberately misleading CND "disarm or be annihilated" pro-dictatorship ("communism" scam) political anti-nuclear deterrence dogma. Hiroshima and Nagasaki anti-nuclear propaganda effects lies on blast and radiation for modern concrete cities is debunked by solid factual evidence kept from public sight for political reasons by the Marx-media which is not opposed by the remainder of the media, and the completely fake "nuclear effects data" sneaks into "established pseudo-wisdom" by the back-door. Another trick is hate attacks on anyone telling the truth: this is a repeat of lies from Nobel Peace Prize winner Angell and pals before WWI (when long-"outlawed" gas was used by all sides, contrary to claims that paper agreements had "banned" it somehow) and WWII (when gas bombing lies prior to the war by Angell, Noel-Baker, Joad and others were used as an excuse to "make peace deals" with the Nazis, again, not worth the paper they were printed on). Mathematically, the subset of all States which keep agreements (disarmament and arms control, for instance) is identical to the subset of all States which are stable Democracies (i.e., tolerating dissent for the past several years), but this subset is - as Dr Spencer Weart's statistical evidence of war proves in his book *Never at War: Why Democracies Won't Fight One Another* - not the bloody war problem! Because none of the disarmaments grasp set theory, or bother to read Dr Weart's book, they can never understand that disarmament of Democracies doesn't cause peace but causes millions of deaths.**

Russians being prepared for use of nuclear weapons, says Ukra

**PLEASE CLICK HERE for the truth from Hiroshima and Nagasaki for the shielding of blast and radiation effects by modern concrete buildings in the credible nuclear deterrence of invasions which - unlike the countervalue drivel that failed to prevent WW2 costing millions of human lives - worked in the Cold War despite the Western media's obsession with treating as Gospel truth the lying anti-nuclear propaganda from Russia's World Peace Council and its allies (intended to make the West disarm to allow Russian invasions without opposition, as worked in Ukraine recently)! Realistic effects and credible nuclear weapon capabilities are needed for deterring or stopping aggressive invasions and attacks which could escalate into major conventional or nuclear wars. Credible deterrence is through simple, effective protection against concentrated and dispersed invasions and aerial attacks, debunking inaccurate, misleading CND "disarm or be annihilated" left political anti-nuclear deterrence dogma. Hiroshima and Nagasaki anti-nuclear propaganda effects lies on blast and radiation for modern concrete cities is debunked by solid factual evidence kept from public sight for political reasons by the Marx-media.**

Examples of omissions and deceptions in Glasstone and Dolar

Russian State TV channel prepares its people for nuclear war 2

**Glasstone's and Nukemap's fake Effects of Nuclear Weapons effects data for unobstructed deserts, rather than realistic blast and radiation shielding concrete jungles which mitigate countervalue damage as proved in Hiroshima and Nagasaki by Penney and Stanbury, undermine credible world war deterrence just as Philip Noel-Baker's 1927 BBC radio propaganda on gas war knock-out blow lies were used by Nazi propaganda distributing "pacifist disarmers" to undermine deterrence of Hitler's war, murdering tens of millions deliberately through lies (e.g. effective gas masks don't exist) that were easy to disprove, but supported by the mainstream fascist leaning press in the UK. There is not just one country, Russia, which could trigger WW3, because we know from history that the world forms alliances once a major war breaks out, apart from a few traditional neutral countries like Ireland and Switzerland, so a major US-China war over Taiwan could draw in support from Russia and North Korea, just as the present Russian invasion and war against Ukraine has drawn in Iranian munitions support for Russia. So it is almost certain that a future East-vs-West world war will involve an alliance of Russia-China-North Korea-Iran fighting on multiple fronts, with nuclear weapons being used carefully for military purposes (not in the imaginary 1930s massive "knockout blow" gas/incendiary/high explosive raids against cities that was used by the UK media to scare the public into appeasing Hitler and thus enabling him to trigger world war; Chamberlain had read Mein Kampf and crazily approved Hitler's plans to exterminate Jews and invade Russia starting a major war, a fact censored out of biased propaganda hailing Chamberlain as a peacemaker).**

**Realistic effects and credible nuclear weapons capabilities are VITAL for deterring or stopping aggressive invasions and attacks which could escalate into major conventional or nuclear wars debunk Marx media propagandarists who obfuscate because they don't want you to know the truth, so activism is needed to get the message out against lying frauds and open fascists in the Russian supporting Marx mass media, which sadly includes government officialdom (still infiltrated by reds under beds, sorry to Joe MaCarthy haters, but admit it as a hard fact that nuclear bomb labs in the West openly support Russian fascist mass murders; I PRAY THIS WILL SOON CHANGE!).**

"From Berkeley to Berlin" Part 8 — Tom Ramos

**ABOVE: Tom Ramos at Lawrence Livermore National Laboratory (*quoted at length on the development details of compact MIRV nuclear warhead designs in the latest post on this blog*) explains how the brilliant small size primary stage, the Robin, was developed and properly proof-tested in time to act as the primary stage for a compact thermonuclear warhead to deter Russia in the 1st Cold War, something now made impossible due to Russia's World Peace Council propaganda campaigns. (*Note that Ramos has a new book published, called From Berkeley to Berlin: How the Rad Lab Helped Avert Nuclear War which describes in detail in chapter 13, "First the Flute and Then the Robin", how caring, dedicated nuclear weapons physicists in the 1950s and 1960s actually remembered the lesson of disarmament disaster in the 1930s, and so WORKED HARD to develop the "Flute" secondary and the "Robin" primary to enable a compact, light thermonuclear warhead to help deter WWIII! What a difference to today, when all we hear from such "weaponeers" now is evil lying about nuclear weapons effects on cities and against Western civil defence and against credible deterrence on behalf of the enemy.*)**

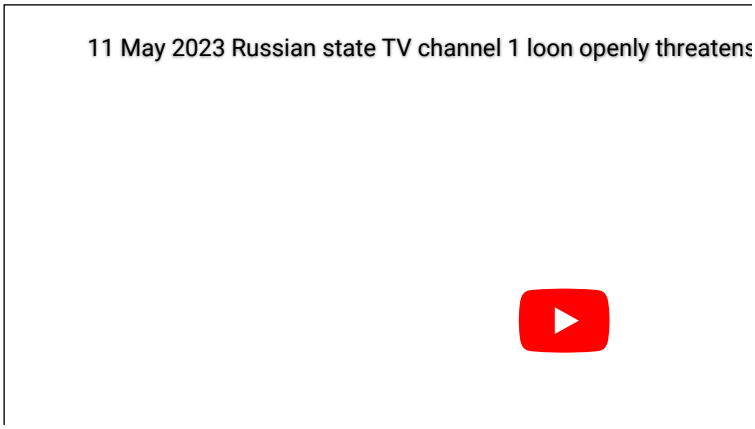
Neutron Bomb | Trailer | Available Now

**ABOVE: Star Wars filmmaker Peter Kuran has at last released his lengthy (90 minutes) documentary on *The neutron bomb*. Unfortunately, it is not yet being widely screened in cinemas or on DVD Blu Ray disc, so you have to stream it (if you have fast broadband internet hooked up to a decent telly). At least Peter managed to interview Samuel Cohen, who developed the neutron bomb out of the cleaner Livermore devices Dove and Starling in 1958 (Ramos says Livermore's director, who invented a wetsuit, is now trying to say Cohen stole the neutron bomb idea from him! Not so, as RAND colleague and 1993 Effects Manual EM-1 editor Dr Harold L. Brode explains in his recent brilliant book on the history of nuclear weapons in the 1st Cold War (reviewed in a post on this blog in detail) that Cohen was after the neutron bomb for many years before Livermore was even built as a rival to Los Alamos. Cohen had been into neutrons when working in the Los Alamos Efficiency Group on Little Boy in 1944.)**

**For the true effects in modern city concrete buildings in Hiroshima and Nagasaki, disproving the popular lies for nudes in open deserts used as the basis for blast and radiation calculations by Glasstone and Nukemap, please click here The deceptive bigots protraying themselves as Federation of American Scientists genuine communist disarmers in the Marx media including TV scammers have been suppressing the truth to sell fake news since 1945 and in a repetition of the 1920s and 1930s gas war media lying for disarmament and horror news scams that caused disarmament and thus encouraged Hitler to initiate the invasions that set off WWII!**

**Glasstone's Effects of Nuclear Weapons exaggerations completely undermine credible deterrence of war: Glasstone exaggerates urban "strategic" nuclear weapons effects by using effects data taken from unobstructed terrain (without the concrete jungle shielding of blast winds and radiation by cities!), and omits the most vital uses and most vital effects of nuclear weapons: to *DETER* world war credibly by negating the concentrations of force used to invade Belgium, 1914 (thus WWI) and Poland (WWII). Disarmament and arms control funded propaganda lying says any deterrent which is not**

**actually exploded in anger is a waste of money since it isn't being "used", a fraud apparently due to the title and content of Glasstone's book which omits the key use and effect of nuclear weapons, to *prevent* world wars: this is because Glasstone and Dolan don't even bother to mention the neutron bomb or 10-fold reduced fallout in the the Los Alamos 95% clean Redwing-Navajo test of 1956, despite the neutron bomb effects being analysed for its enhanced radiation and reduced thermal and blast yield in detail in the 1972 edition of Dolan's edited secret U.S. Department of Defense Effects Manual EM-1, "Capabilities of Nuclear Weapons", data now declassified yet still being covered-up by "arms control and disarmament" liars today to try to destroy credible deterrence of war in order to bolster their obviously pro-Russian political anti-peace agenda. "Disarmament and arms control" charlatans, quacks, cranks, liars, mass murdering Russian affiliates, and evil genocidal Marxist media exposed for what it is, what it was in the 1930s when it enabled Hitler to murder tens of millions in war .**




**ABOVE: 11 May 2023 Russian state TV channel 1 loon openly threatens nuclear tests and bombing UK. Seeing how the Russian media is under control of Putin, this is like Dr Goebbels rantings, 80 years past. But this doesn't disprove the world war threat any more than it did with Dr Goebbels. These people, like the BBC here, don't just communicate "news" but attempt to do so selectively and with interpretations and opinions that set the stage for a pretty obviously hate based political agenda with their millions of viewers, a trick that worked in the 1st Cold War despite Orwell's attempts to lampoon it in books about big brother like "1984" and "Animal Farm". *When in October 1962 the Russians put nuclear weapons into Cuba in secret without any open "threats", and with a MASSIVELY inferior overall nuclear stockpile to the USA (the USA had MORE nuclear weapons, more ICBMs, etc.), the media made a big fuss, even when Kennedy went on TV on 22 October and ensured no nuclear "accidents" in Cuba by telling Russia that any single accidentally launched missile from Cuba against any Western city would result in a FULL RETALITORY STRIKE ON RUSSIA. There was no risk of nuclear war then except by accident, and Kennedy had in his 25 May 1961 speech on "Urgent National Needs" a year and a half before instigated NUCLEAR SHELTERS in public basement buildings to help people in cities survive (modern concrete buildings survive near ground zero Hiroshima, as proved by declassified USSBS reports kept covered up by Uncle Sam). NOE THAT THERE IS A CREDIBLE THREAT OF NUCLEAR TESTS AND HIROSHIMA TYPE INTIMIDATION STRIKES, THE BBC FINALLY DECIDES TO SUPPRESS NUCLEAR NEWS SUPPOSEDLY TO HELP "ANTI-NUCLEAR" RUSSIAN PROPAGANDA TRYING TO PREVENT US FROM GETTING CREDIBLE DETERRENCE OF INVASIONS, AS WE HAD WITH THE W79 UNTIL DISARMERS REMOVED IT IN THE 90s! This stinks of prejudice, the usual sort of hypocrisy from the 1930s "disarmament heroes" who lied their way to Nobel peace prizes by starting a world war!***

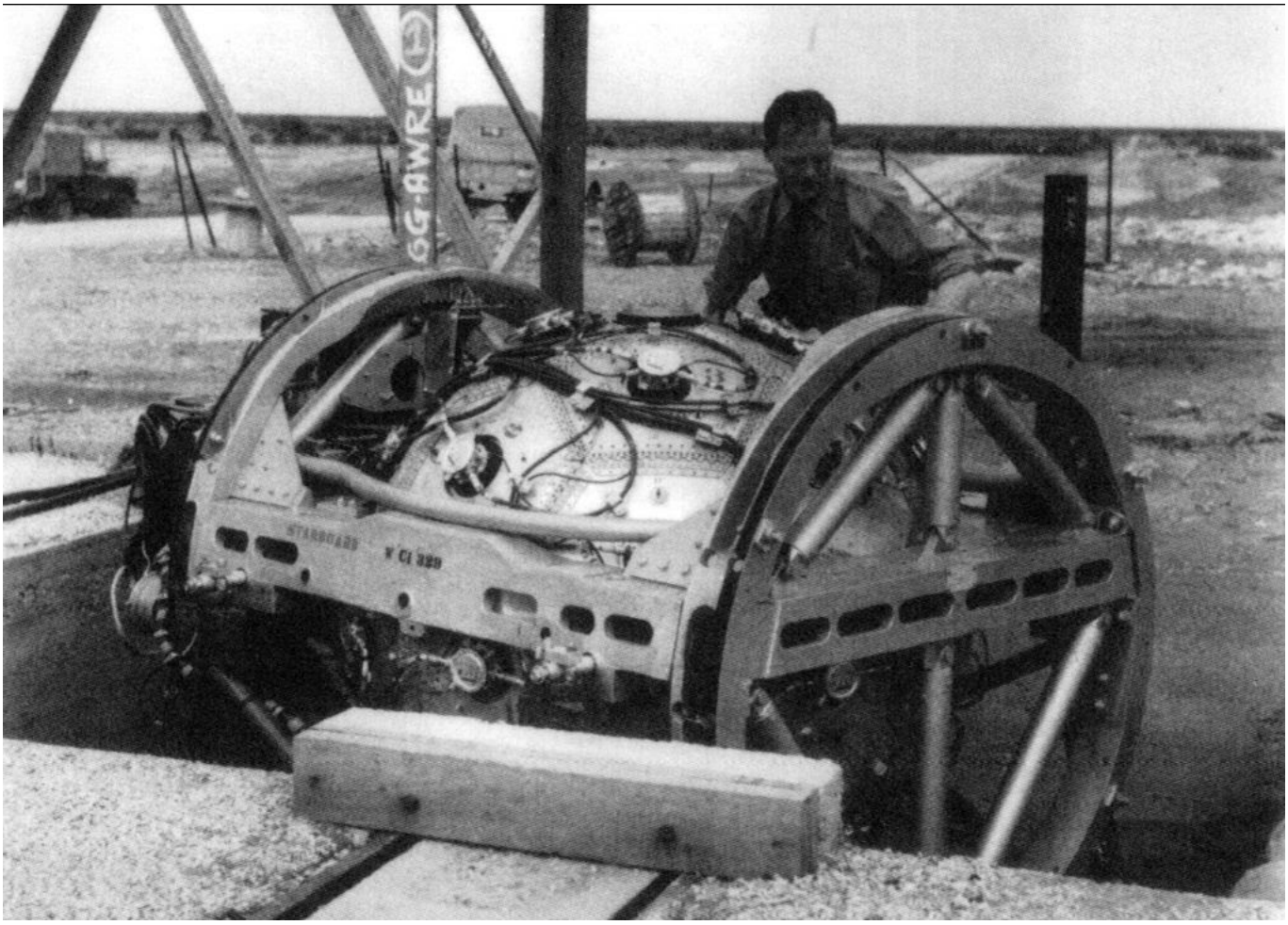
**The facts from Hiroshima and Nagasaki for the shielding of blast and radiation effects by modern concrete buildings in the credible nuclear deterrence of invasions (click here for data) which - unlike the countervalue drivel that failed to prevent WW2 costing millions of human lives - worked in the Cold War despite the Western media's obsession with treating as Gospel truth the lying anti-nuclear propaganda from Russia's World Peace Council and its allies (intended to make the West disarm to allow Russian invasions without overwhelming, effective deterrence or opposition, as worked in Ukraine recently)!**

**Realistic effects and credible nuclear weapon capabilities are required now for deterring or stopping aggressive invasions and attacks which could escalate into major conventional or nuclear wars. Credible deterrence necessitates simple, effective protection against concentrated and dispersed invasions and bombing. The facts can debunk massively inaccurate, deliberately misleading CND "disarm or be annihilated" pro-dictatorship ("communism" scam) political anti-nuclear deterrence dogma. Hiroshima and Nagasaki anti-nuclear propaganda effects lies on blast and radiation for modern concrete cities is debunked by solid factual evidence kept from public sight for political reasons by the Marx-**

**media, which is not opposed by the fashion-obsessed remainder of the media, and so myths sneak into "established pseudo-wisdom" by the back-door.**

**Sunday, August 02, 2009**

**Glasstone and Dolan nuclear crater sizes exaggeration**




ABOVE: The 1956 Australian-British Maralinga cratering nuclear surface burst, Buffalo-2, prepared for firing at Marcoo site. The middle of the weapon is carefully aligned to the height of the ground surface. Notice however that the weapon, despite having a low yield of just 1.4 kt, is a massive implosion device with a diameter of 5 feet. The heavy weight of the implosion system and carrying cradle *added mass for the "case shock" of the weapon increasing the energy carried by that dense case shock,* as opposed to the percentage of energy released from the weapon as the X-ray emission; the altered partition of energy between bomb case kinetic energy and X-ray fireball energy dramatically increase the cratering and ground shock effects.

X-rays dispersed outside of the bomb have only a trivial effect on the ground, ablating a thin surface layer of the ground and heating up the air, contributing mostly to air blast, not direct ground shock or cratering (it does produce the "air slap" ground shock, but this is rapidly dissipated with depth into the ground). *The downward portion of the dense case shock, on the other hand, embeds itself deeply into the ground, and is the major source of cratering and direct ground shock, coupling about half of the case shock kinetic energy into the surface and producing essentially all of the cratering and close-in ground shock energy.*

Air-slap from the blast produces on a trivial effect on the crater and ground shock because of its relatively low density (the transfer of energy from an air shock wave into the ground is trivial because of the mismatch of acoustic impedance in the two media, due to the fact that the ground is much denser than the air shock wave even at the greatest overpressures near ground zero). Heavy weapons with a relatively small yield to mass ratio are thus *far* more effective at cratering than modern lightweight designs. (This bomb design effect on cratering was proved by H. L. Brode and R. L. Bjork in their 1960 RAND Corporation report RM-2600, *Cratering from a Megaton Surface Burst,* but was never even mentioned in Glasstone's *Effects of Nuclear Weapons.*)

FIGURE 9-16b. HARDTACK, SHOT KOA, ENIWETOK ATOLL, SITE GENE, 13 MAY 1958, 1.37 MT, PHOTO: D + 8, 21 MAY 1958, POST-SHOT CONCRETE BEAM EXP, 6.5 FT. LOWER THAN PRE-SHOT AT 1,830 FT., PO = 1,130 PSI, RA = 2,160 FT.

9-33

**Above:** excerpt from Dr Frank H. Shelton's revised (2nd printing, 1990) book *Reflections of a nuclear weaponeer*, dealing with cratering (earlier in the book he gives an account of his Wednesday 25 March 1987 slide show on "Thermonuclear weapon tests and Pacific craters", debunking Glasstone and Dolan's *Effects of Nuclear Weapons* analysis at Lawrence Livermore National Laboratory, and the next day, at 10am in Edward Teller's office at that lab, he explained how American nuclear test cratering analysis was fatally flawed, receiving in return Teller's usual complete incomprehension, disinterest and lack of support for nuclear weapons effects improvements. Shelton had visited a concrete beam experiment at Eniwetok Atoll (color photos above from page 9-33 of Shelton's book): after the 1.37 megaton Koa surface burst, they were sticking up above the ground surface. This proved that the Pacific coral craters are not the ejecta cratering that occurs in dry soil, but merely compression of coral by high pressure. Teller didn't want to know. This problem continues in the whole DTRA approach to the revision of cratering, e.g. failing to publish an unclassified correction/update for the 1977 Glasstone and Dolan *Effects of Nuclear Weapons*, and bungling the cratering chapter 3 of the 1992 revised EM-1 as abstracted in John A. Northrop's 1996 limited-distribution *Handbook of Nuclear Weapon Effects: Calculational Tools Abstracted from EM-1*. The latter masters the art of being as clear as mud, by obfuscating the crater dimensions corrections, by breaking the crater scaling laws into two parts: section 3.1.1.2 on page 79 and table 3.3 on page 84 assume that the initial x-ray yield fraction varies from <20% at <1 kt to >80% at >20 kt, and gives scaling laws based on these assumptions for various soil types, which appear to contradict what Northrop writes on page 80, section 3.1.1.4 where he writes that for "small yield" weapons the crater volumes are directly proportional to yield (*so for conventional bombs and sub-kiloton nuclear weapons, the crater diameter and depth scale as the cube-root of yield*), whereas for "**higher yields, where gravity effects become important**", crater sizes scale less than proportionally with yield! (But after that very brief useful mention, Northrop says nothing further of the effect of gravity on the huge recent crater scaling law revisions!)

However, Northrop on page 86, section 3.1.3, suddenly discloses how EM-1 incorporates gravity effects at high yields (without mentioning "gravity" at that point): he states that the crater scaling laws in the earlier sections of the chapter are non-observable (pretty much imaginary) "dynamic crater size", and the observable or "apparent" crater is *smaller* due to a large proportion of the ejected material falling or slumping back into the crater, to partially re-fill it, which reduces the apparent crater size (the fallback effect)! Therefore, we find that the crater scaling laws he gave in table 3.3 are fictitious and need to be modified by a further equation (equation 3.16), which has a yield dependence that effectively changes the crater sizes scaling laws.

Northrop's equation 3.16 states that the apparent crater volume, $V_{apparent} = V_{dynamic}(1 - f_{fallback})$, where $f_{fallback}$ is defined in equation 3.17 as $f_{fallback} = 0.27$ for all yields and soils apart from dry soil. *This constant value appears in serious error, contradicting other crater revisions data that we will discuss later in this blog post.* However, for dry soil and for high x-ray output weapons (yields of 20kt and above, with x-ray yields of 80% or greater), equation 3.18 yields: $f_{fallback} = 0.470 - 0.313W^{-0.145}$, where weapon W is yield in kilotons. This implies that $f_{fallback} = 0.157$ for 1kt, 0.355 for 1 Mt and 0.388 for 10 Mt. Thus, putting equation 3.18 into equation 3.17, we get $V_{apparent} = V_{dynamic}(0.530 + 0.313W^{-0.145}) = 0.843$ for 1 kt, 0.645 for 1 Mt and 0.612 for 10 Mt. These values do not give the correct crater scaling as compared to detailed results in articles and books on the revision to cratering, given later in this blog post. Northrop gives no graphs to evaluate or compare these formulae with nuclear test data, or with detailed computer cratering simulations. Consequently, Northrop's book is of no use in helping to understand or predict crater size revisions due to gravity effects.

Northrop in several places admits to confronting classification difficulties with secrecy on nuclear weapons effects, e.g. he only summarises 1993 EM-1 chapters 2-11, 14-16, 18 and 21-22, stating in his preface (p. iii) that the other 6 chapters of EM-1 are omitted from the handbook partly, "as a result of their extensive classified database". The thermal radiation and initial nuclear radiation data omit shielding due to city skylines are so are entirely misleading unless bombs are dropped on unobstructed deserts. This classification problem also affects his data summaries. E.g., Chapter 10, *Electromagnetic Pulse Effects,* omits the actual high altitude EM-1 EMP data (except for surface burst, where a detailed model for radiated surface burst EMP waveforms is provided), due to its secrecy classification and instead gives a simplified EMP model from report DNA-TR-84-47 (dated 1984) in figures 10.4 and 10.5, showing that a 400 km altitude burst produces a maximu peak EMP of 4, 20 and 40 kV/m for weapon prompt gamma ray yields of 0.1, 1 and 10 kt, respectively, while the fraction of this maximum which extends to the earth's horizon or tangent point ranges from 0.1-0.5 as prompt gamma ray yield is increased from 0.1-10 kt. While Northrop's book does contain many useful nuggets of data from the 1993 EM-1,including useful tables of neutron and gamma ray outputs from neutron bombs in tables 8.5 and 8.6 on page 337, and many useful graphs and tables of x-ray ablation effects for ABM or thermonuclear warhead design, it has many limitations on consistency. (Northrop's 1996 book is the result of thousands of pages of "sanitized" i.e. partly declassified EM-1 chapters, with deletions of data that can not be declassified, produced during the mid-1990s, as a result of a Freedom of Information Act request by a third-party, allegedly interested in arms control, which has failed to publish the information in full.)

CHAPTER 4

Although the GEORGE detonation occurred 200 feet above the surface of the coral island, a shallow crater formed that was 10 feet deep and 1,140 feet in diameter, into which rolled the waters of Eniwetok lagoon a few minutes after the shot. The edge of the shallow depression, caused by pressure collapse of voids in the coral reef, was at about 5,000 pounds per inch (psi) blast pressure. If we had carefully noted this mechanism for crater formation in the coral reef material, the confusion regarding the crater dimension of large yield surface bursts in the Pacific as compared to extrapolations of small yield surface bursts in Nevada would have been resolved in the early 1950s instead of the early 1980s. The continuing classification of the yield of GEORGE event has contributed to a lack of appreciation of some of its nuclear weapon effects implications. (26)

CHAPTER 5

## Which Is Best--A Surface Burst, Or A Smaller Yield Earth Penetrator?

A gun assembly type nuclear weapon had been developed that had, among other applications, the capability of ground penetration. The depth of penetration of the gun weapon depended upon the type of earth in the target area. A penetration of 30-40 feet was expected in sand, 45-60 feet in loam, and 85-100 feet in plastic clay.

Another possible nuclear weapon for cratering would be a surface burst bomb with a theoretical yield of about 83 KT. However, an implosion type bomb would not be capable of earth penetration, but could be a surface burst with a contact fuze.

If the hypothetical earth penetrator bomb was dropped in the center of an airfield runway, and penetrated to about 50 feet in depth, it would produce a crater 700 feet in diameter and 140 feet deep with a volume of 900,000 cubic yards. It would require about 30 days' work to fill in the bomb crater, working under deadly radioactive dose rates. The surface burst bomb would produce a crater 300 feet in diameter by 70 feet deep, with a volume of 68,000 cubic yards, that could be filled in in about a week, under similar radioactive environments as the underground burst. Clearly from a yield point of view, the smaller yield penetrating bomb was better than the surface burst weapon. However, an implosion bomb is less expensive than a gun type in fissile material equivalence. (9: JANGLE S&U fallout.)

The fact that JANGLE SURFACE burst not on the surface (the center of the device 3.5 feet above the ground) complicated understanding and calculations of the ir coupling of the bomb energy to the gro JANGLE UNCLE (17 feet underground) contained in an air-filled cubical plywood box the vertical hole was backfilled with sandb

JANGLE SURFACE burst was the first only surface burst of a nuclear device at Nevada Test Site. As a guest at the British r lear tests in Australia on Operation BUFFAL April 1956, I was escorted by Sir William Per on a tour of the site of their surface burst. A observing the configuration of the nuclear dev I remarked, "with the bomb half in and half ou the ground, you will have initial conditions that missed on JANGLE SURFACE burst." Altho the two yields were about the same, their cr dimensions were quite different, due to a c

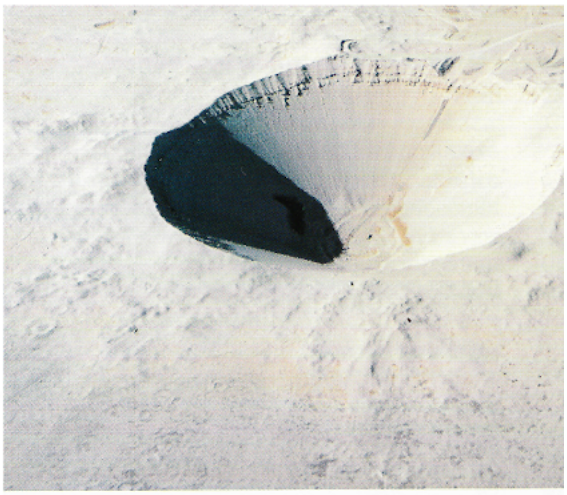


FIGURE 12-2. SEDAN CRATER, 6 JULY 1962, "CLEAN" 100 KT SAME SIZE CRATER AS 1 MT SURFACE BURST

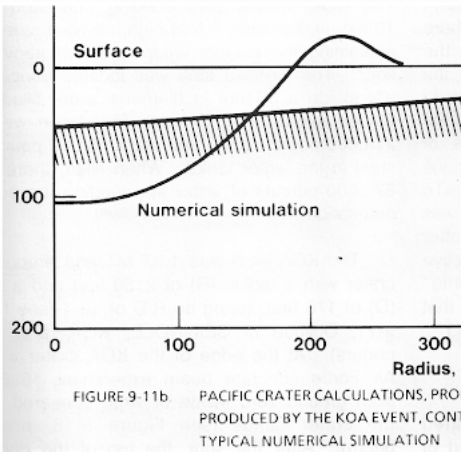
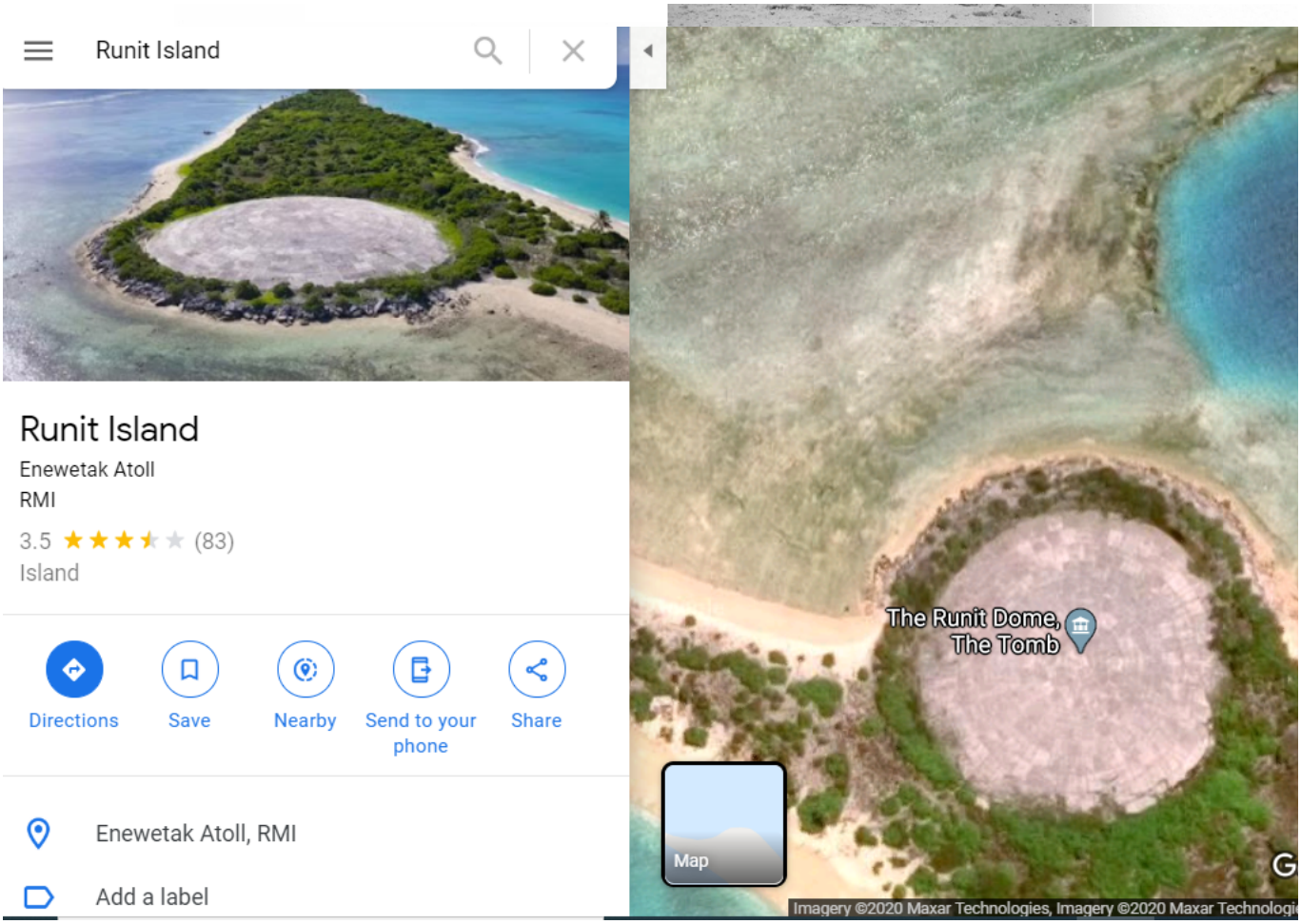



FIGURE 9-11b. PACIFIC CRATER CALCULATIONS, PRO PRODUCED BY THE KOA EVENT, CONT TYPICAL NUMERICAL SIMULATION

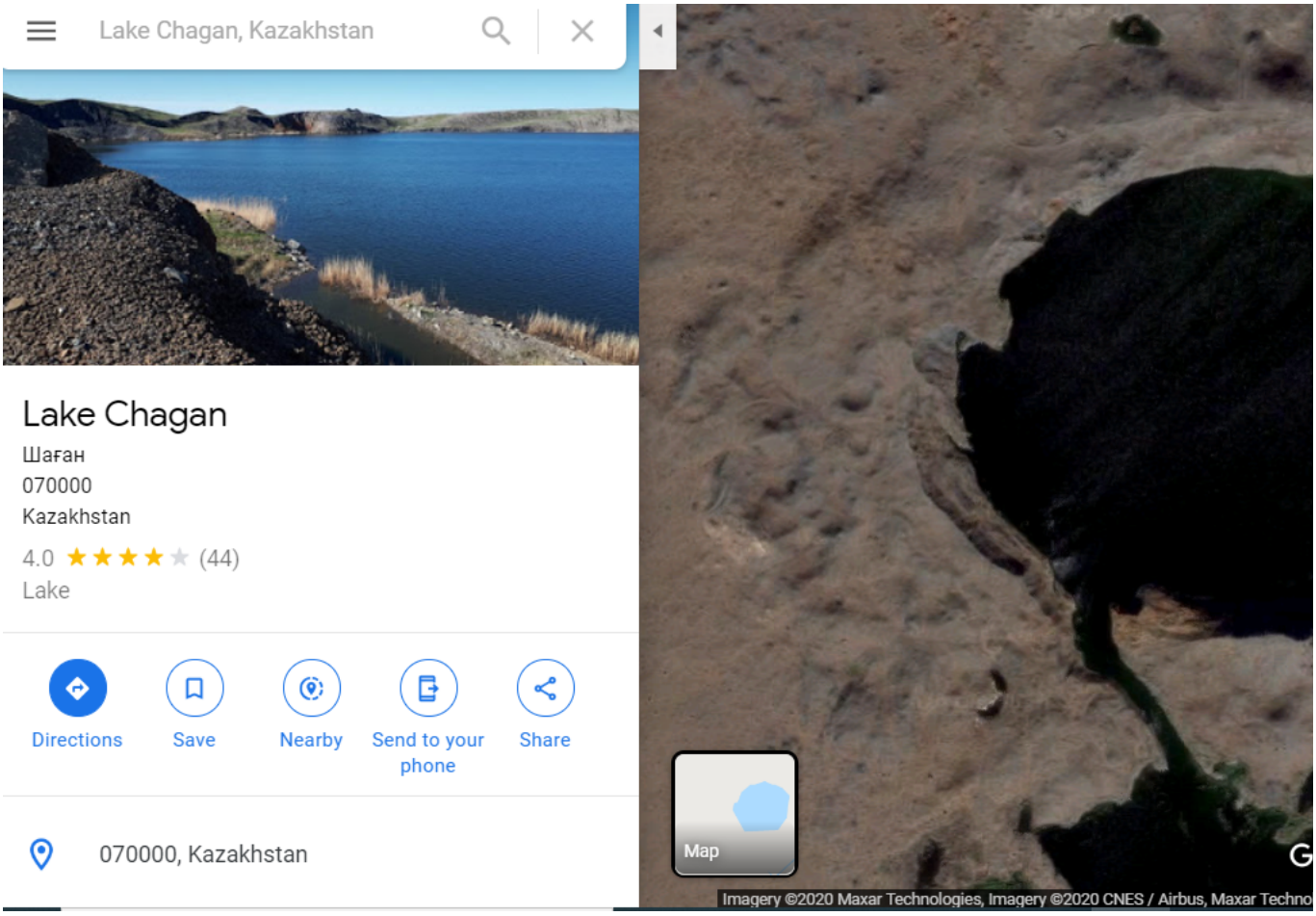
FIGURE 9-16b. HARDTACK, SHOT POST-SHOT CONC




**ABOVE: Google satellite photograph of Runit Island in Eniwetok Atoll**, showing two nuclear weapon test craters. The 105 m diameter, 11 m deep crater from the 18 kt *Hardtack-Cactus* 6 May 1958 surface burst nuclear test crater on Runit Island was **used as a convenient nuclear waste dump during the decontamination of the Atoll in 1979, and was topped with a concrete dome**, which is visible in the Google satellite photograph. The 120 m diameter, 17 m deep water-filled crater in the reef seen in the photo above, just to the North-East of Runit Island, was formed by the 40 kt *Redwing-Lacrosse* nuclear test 17 feet over the reef on 5 May 1956.

The 15 megaton ***Castle-Bravo*** **test of 1 March 1954 and a later smaller test produced the two large overlapping craters shown below in the reef near Namu Island to the North-West of Bikini Atoll**:


Image © 2007 DigitalGlobe
©2006 Google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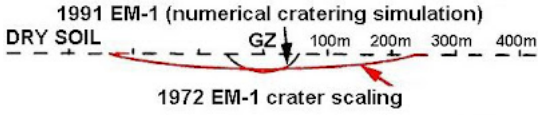
Lake
Directions
Save
Nearby
Send to your phone
Share
070000, Kazakhstan
Map
Imagery ©2020 Maxar Technologies, Imagery ©2020 CNES / Airbus, Maxar Techno

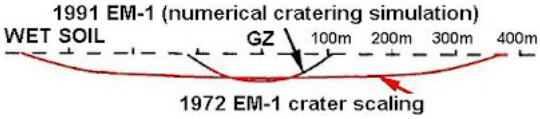
**Above: the world's first nuclear explosion-created freshwater lake, *Lake Chagan*. It was produced on 15 January 1965 at the edge of the Semipalatinsk Test Site in Kazakhstan using a 140 kt (96% fusion, 4% fission) thermonuclear weapon, detonated 178 m underground in saturated siltstone (12% water), employing a two 3 kt fission primary stages. About 80% of the radioactivity was trapped underground and only 20% escaped into the atmosphere. The crater is 408 m in diameter and 100 m deep. The dose rate on the crater lip at 30 years after detonation was reported as 2.6 mR/hr, i.e. about 260 times the Earth's average natural background radiation level of 0.010 mR/hr, with the lake water in the crater containing just 300 pCi/litre. On the 10 October 1965, they detonated a 1.1 kt nuclear bomb at 48 m depth in weak siltstone rock under the dry clay bed of the Sary-Uzen stream. The crater produced was initially 107 m in diameter and 31 m deep, but when flooded it slumped to 20 m depth and 124 m diameter. Some 96.5% of the fission products were trapped underground, and the crater lip had a dose rate of only about 2.5 R/hr at 5 days after detonation, decaying to 0.050 mR/hr (including natural background) at 30 years later. (Data source: Milo D. Nordyke, *The Soviet Program for Peaceful Uses of Nuclear Explosions,* Lawrence Livermore National Lab., UCRL-ID-124410, July 1996, pp. 13-15.)**

Crater radius for a surface burst on dry soil

| 1 Mt | 10 Mt | U.S. Department of Defense source |
|---|---|---|
| 192 m | 414 m | *The Effects of Nuclear Weapons*, 1957, 1962, 1964 |
| 148 m | 295 m | *The Effects of Nuclear Weapons*, 1977 |
| 58 m | 92 m | *Capabilities of Nuclear Weapons*, 1991 |

1 MEGATON CONTACT SURFACE BURST CRATER




| | DRY SOIL | WET SOIL |
|---|---|---|
| 1972 EM-1 | 1,400 $m^3$/kt | 5,700 $m^3$/kt |
| 1991 EM-1 | 165 $m^3$/kt | 775 $m^3$/kt |

There are three reports now available online which throw light on the replacement to the **Glasstone and Dolan *Effects of Nuclear Weapons* and its secret supplement *Capabilities of Nuclear Weapons,* Effects Manual EM-1**:

1. **Kenneth E. Gould, *A Guide to Nuclear Weapons Phenomena and Effects Literature,* Kaman Tempo, Santa Barbara, CA., Technical Report ADB094426, DASIAC Special Report DASIAC-SR-206, 31 October 1984** which usefully states on **page 5**:

'*Capabilities of Nuclear Weapons,* DNA EM-1 (Reference C-2), is the best single comprehensive reference on all aspects of nuclear weapon phenomena and effects. This classified two-volume set both complements and supplements *The Effects of Nuclear Weapons.* Volume 1 focuses on nuclear weapon phenomenology and Volume 2 covers nuclear weapon effects that are primarily of military interest. This major DNA handbook, often referred to by its report number "EM-1," was last published in 1972 (with minor revisions through 1981), but it is presently being completely revised. When updated, EM-1 will again serve its important role as a basic source document for the preparation of nuclear operational and employment manuals by the military services.'

2. **John R. Murphy, et al., *Nuclear Effects Data Management and Analysis System (NEDMAS),* DSWA-TR-96-94, Defense Special Weapons Agency, 1997,** which gives some details of the new computer database for the effects of tests, and

3. **Ernest Bauer, *Variabilities in the Natural and Nuclear Endoatmospheric Environment,* Institute for Defense Analyses, Virginia, IDA Document D-1085, April 1992.**

**Appendix A of this third report consists of a document by A. A. Fredrickson called *Revision of DNA Nuclear Crater Specifications,* taken from the September 1991 issue of *Nuclear Survivability*:**

> DNA [Defense Nuclear Agency, which has since evolved into the **DTRA**] has recently completed an "end-to-end" cratering validation program that resulted in dramatic reduction of the crater size thought to result from the surface detonation of modem strategic weapons. Although a major field exploration and several underground nuclear tests conducted in this program occupied the spotlight, numerical simulations were in many ways more central to DNA's success. This article recounts the integrated role of the numerical simulations, re-interpretation of existing nuclear data, and additional field events in the evolution of DNA's view on nuclear cratering.
>
> DNA developed a crater specification methodology for its 1972 ***Capabilities of Nuclear Weapons - Effects Manual Number 1 (EM-1)*** with the acknowledgment that the nuclear database was incomplete and probably inappropriate for application to strategic yield surface burst weapons. The cratering events conducted at the Nevada Test Site (NTS) employed low yield sources suspected to produce larger craters than modern weapons of strategic interest. Data from the several high yield cratering events conducted at the Pacific Proving Grounds (PPG) were considered flawed by the atoll reef geology that was highly dissimilar to sites of interest. The 1972 **EM-1** methodology was an attempt to reconcile these shortcomings.

The strategic source surface burst crater specifications were based on high yield PPG data, calibrated to sites of interest by comparison of low yield nuclear and high explosive craters in various geologies. Figure A.1 depicts 1 Megaton crater profiles for two geology types as specified in 1972 **EM-1**. ...

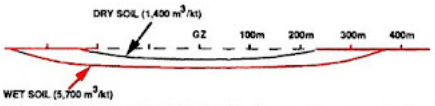



**Figure A.1. 1 Mt Contact Burst Crater Profiles for Two Generic Geologies as Specified by DNA EM-1 (1972)**

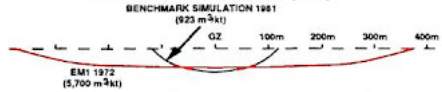



**Figure A.2. Comparison of 1 Mt Contact Profiles for Two Generic Geologies as Specified by EM-1 (1972) and Predicted by DNA Benchmark Numerical Simulation (1981)**

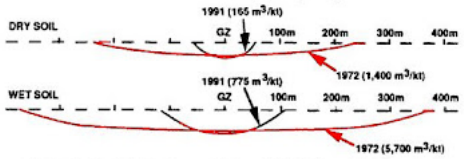



**Figure A.5. Comparison of Current DNA Specification for 1 Mt Crater Profiles with 1972 Specifications**

The numerical simulations indicated that strategic yield sources would produce craters one-third to one-fifth the scaled size produced in these events due to the relative inefficiency of the x-ray coupling process relative to hydrodynamic coupling. ...

Today, DNA relies on numerical cratering and ground shock simulations as key integral parts of its experimental program. They are the basis for cratering specifications for near-surface bursts in **EM-1, 1991**. Figure A.5 compares 1991 EM-I craters on two geology types to the profiles perceived in 1972. This dramatic shift in perception is based on the compelling evidence obtained in the highly successful field program discussed in this article. The current DNA reliance on numerical simulations is a result of the recognition that they provided the motivation for this program, enabled the success of the field activities, and today provide the means to apply this test experience to specific strategic weapon and geology combinations of interest. ...

**In the earlier blog post (recently updated) on Glasstone and Dolan, I pointed out that, along with most effects, the crater predictions given by Glasstone and Dolan are massive exaggerations for high yields. There is a transition from cube-root explosive crater dimensions scaling at yields up to a few kilotons, to fourth-root gravity scaling in the megaton range**. The cube-root scaling law occurs because the energy needed to heat, shock and explosively disrupt air or soil is directly proportional to the mass of that air or soil. Thus, the volume of ambient air or soil subjected to a particular shock overpressure scales in directly proportion to the energy of the explosion; which means that the radius of that volume scales in proportion to the cube-root of the explosion energy.

For high yield surface bursts, however, there is another vitally important use of energy in order to excavate a big crater: the energy needed to do work against gravity in order to raise the mass of dirt from the hole and dump it outside to form the 'lip' and 'ejecta' region around the crater (afterwind lofted fallout dust is merely ~1% of the crater mass). This energy is simply $E = mgh$ where $m$ is the cratered mass raised average height $h$ against gravitational acceleration $g$. Taking this into account means that for high yields $h$ and particularly $m$ both become very large, so that the gravitational work energy needed to form a massive crater is immense and can then exceed that of the explosive break-up of the soil. (For low yields, the gravitational work energy is trivial compared to that used to break up the soil explosively, because of the smaller mass and smaller crater depth.) If the crater diameter to depth ratio is constant, then the cratered mass $m$ is proportional to the cube of the depth $h$, or $m = bh^3$ where $b$ is a constant, so $E = mgh = bh^3gh = bh^4g$. Rearranging, $h \sim E^{1/4}$ for high yields. There are other factors involved of course, because the amount of energy used for cratering is essentially the downward-directed case-shock energy of the bomb debris (the air blast doesn't have enough density and thus enough momentum to dig out the crater, it just causes some compression). This is a limited fraction of the explosion energy, so the energy utilization in explosively heating, compressing and breaking up the crater material limits the energy available for ejecting it against gravity. This energy balance will usually be accompanied by some change in the ratio of crater diameter to depth, so the craters will not always exactly behave the fourth-power scaling law in the megaton range. **Nevertheless, there is a massive exaggeration of high-yield crater sizes in the *Effects of Nuclear Weapons* 1977 and related documents.**

The earliest mainstream American statement made that crater dimensions theoretically scale as $W^{1/4}$ for the regime in which gravity is important is by Dr Milo D. Nordyke of the Lawrence Radiation Laboratory in *Cratering Experience with Chemical and Nuclear Explosives* (published in *Proceedings of the Third Plowshare Symposium, Engineering with Nuclear Explosives, April 21, 22, 23, 1964*, U. S. Atomic Energy Commission report TID-7695, TID-4500 (UC-35), pages 51-53. Nordyke states there on page 52: "... the analysis that leads to $W^{1/3}$ ignores the action of several factors such as gravity and the strength or internal frictional forces of the medium. ... one can show that their effect would be to lower the exponent and lead toward $W^{1/4}$ scaling (reference: L. I. Sedov, *Similarity and Dimensional Methods in Mechanics,* Gostekhizdat Press, Moscow, 1954 and Academic Press, New York, 1959, page 251)."

However, Nordyke did not identify the $W^{1/4}$ as applying to the gravity regime for large megaton range explosions that excavating large masses of ejecta over large vertical distances against gravity, and the $W^{1/3}$ law holds for relatively small craters in the sub-kiloton range. Instead, he argued for an interim value of the exponent between the values of 1/3 and 1/4, of about $W^{1/3.4} \sim W^{0.3}$ from empirical data for Nevada desert alluvium. This fudge factor leads to inaccurate extrapolations from the Nevada test data.

**Further reading:**

> **'Data on the coral craters are incorporated into empirical formulas used to predict the size and shape of nuclear craters. These formulas, we now believe, greatly overestimate surface burst effectiveness in typical continental geologies ... coral is saturated, highly porous, and permeable ... When the coral is dry, it transmits shocks poorly. The crushing and collapse of its pores attenuate the shock rapidly with distance ... Pores filled with water transmit the shock better than air-filled pores, so the shock travels with less attenuation and can damage large volumes of coral far from the source.'**

– L.G. Margolin, et al., *Computer Simulation of Nuclear Weapons Effects,* Lawrence Livermore National Laboratory, UCRL-98438 Preprint, 25 March 1988, p. 5.

> **'It is shown that the primary cause of cratering for such an explosion is not "airslap," as previously suggested, but rather the direct action of the energetic bomb vapors. High-yield surface bursts are therefore less effective in cratering by that portion of the energy that escapes as [X-ray] radiation in the earliest phases of the explosion.'**

- H. L. Brode and R. L. Bjork, *Cratering from a Megaton Surface Burst,* RAND Corp., RM-2600, 1960.

**D. E. Burton, et al., *Blast induced subsidence in the craters of nuclear tests over coral,* Lawrence Livermore National Lab., UCRL-91639, 1985:**

> **"The craters from high-yield nuclear tests at the Pacific Proving Grounds are very broad and shallow in comparison with the bowl-shaped craters formed in continental rock at the Nevada Test Site and elsewhere. Attempts to account for the differences quantitatively have been generally unsatisfactory. We have for the first time successfully modeled the Koa Event, a representative coral-atoll test. On the basis of plausible assumptions about the geology and about the constitutive relations for coral, we have shown that the size and shape of the Koa crater can be accounted for by subsidence and liquefaction phenomena. If future studies confirm these assumptions, it will mean that some scaling formulas based on data from the Pacific will have to be revised to avoid overestimating weapons effects in continental geology."**

Another source of information on the revision of crater dimensions is **pages 136-139 of the 1993 book by Bruce G. Blair, *The Logic of Accidental Nuclear War,* published by the Brookings Institution, online here**:

> "Recently the U.S. Department of Defense reviewed the pertinent historical evidence gathered during nuclear tests and developed new models of the vulnerability of underground structures to nuclear explosions. These calculations differed substantially from those derived from earlier models. For example, the dimensions of a crater produced by a nuclear explosion were estimated to be considerably smaller than previously thought. To give a specific comparison, the radius of a crater produced by a one-megaton nuclear explosion on the surface of wet soil would be 651 feet according to the old formula, whereas the new formula estimated the radius to be 394 feet. ... Comparable differentials typically hold across the spectrum of weapon yields and soil varieties. ...
>
> "... Under the new formula the pertinent calculations for this location's geological composition (dry soft rock, according to U.S. analysts) indicate a crater radius of only 180 feet for a one-megaton weapon, or 262 feet for a nine-megaton weapon."

Notice that an increase in crater radius from 180 to 262 feet for a yield increase from 1 to 9 megatons implies a crater scaling power law of $W^{0.171}$, i.e. $180(9 \text{ Mt} / 1 \text{ Mt})^{0.171} = 262$ feet.

**Holsapple's online crater scaling program**

Keith A. Holsapple has a very nice and useful online crater scaling program at **http://keith.aa.washington.edu/craterdata/scaling/index.htm** which allows you to predict crater sizes for comet and asteroid impacts, chemical explosives, and also any yield and burst conditions from two types of nuclear weapon design:

(1) "high weight/energy ratio" inefficient low yield devices typical of early kiloton Nevada tests with a mass to yield ratio of 10 kg/kt, and

(2) "low weight/energy ratio" efficient high yield modern thermonuclear weapons with a mass to yield ratio of 0.42 kg/kt).

He also includes TNT, which of course has a massive weight to yield ratio of 1,000,000 kg/kt by definition. The dense explosion debris embeds itself deeply into the ground, delivering energy deeply into the ground far more efficiently than X-rays which just ablate a surface layer and cause a rapidly attenuated ground shock by the recoil from ablation. Efficient (high energy/weight ratio) nuclear weapons release most of their energy initially as X-rays not the kinetic energy of the dense debris shock wave, so they do not couple much energy deeply into the ground to cause a crater. As a result, high yield modern nuclear weapons use a much smaller proportion of their energy for cratering than inefficient low yield weapons or TNT chemical explosive.

Holsapple gives a sketchy account of the theory in his paper *Theory and equations for "Craters from Impacts and Explosions"* online here: **http://keith.aa.washington.edu/craterdata/scaling/theory.pdf** which for nuclear craters cites:

K. A. Holsapple and S. Peyton, *The Scaling of Nuclear Weapons Effects for Near Surface Bursts,* Defense Nuclear Agency report DNA 6543F (1987), and

R. M. Schmidt, K. R. Housen and K. A. Holsapple, *Gravity Effects in Cratering,* Defense Nuclear Agency report DNA-TR-86-182 (1988).

The approach Holsapple used is the scaling of experimental data through the use of dimensional analysis where the data is allowed to determine the scaling law at high yields, rather than fitting the data to determine coupling constants in a purely physical, mechanistic scaling model based on energy utilization. His equations 6 and 7 show that at low energy yields, the crater size is a stronger function of yield than at higher yields. The low yield limit is called the "strength regime" and crater sizes scale approximately as the cube-root of yield in this regime; at higher yields the scaling is in the "gravity regime" which is a weaker function of yield, closer to the fourth-root. Holsapple in equation 7 gives a "general form with those limits and that interpolates between these two regimes".

One problem is that he gives no derivation of the interpolative formula 7, and another problem is that the limits for the strength regime and gravity regime are not fixed theoretically as cube root and fourth root scaling in his formula, but are defined by experimental data. This is similar to modelling thermal radiation through the atmosphere by simply modifying the inverse-square law to fit the data, e.g. taking the thermal radiation to fall as say $1/R^{2.5}$, instead of adding an exponential term to allow for absorption and scattering by the atmosphere in addition to the inverse square law.

The problem is that we know from physical energy utilization principles that the laws of nature are due to fixed mechanisms and should be fixed theoretically. Variations in the experimental data should be used not to vary the scaling laws provided by the physical mechanism, but instead to determine the physical constants. At low yields, a unit amount of cratering energy excavates a unit mass of soil or rock. If the soil or rock has fixed density, the crater volume at low yields is then directly proportional to the energy yield. By geometry, the radius of a hemisphere is proportional to the cube-root of its volume. If the crater radius-to-depth ratio is a constant, this cube-root law applies to other shapes, too.

Hence, at low yields the cratering theory needs to be tied to the cube-root. At high yields, the influence of gravity is that most of the available cratering energy must be used up in shifting soil or rock out of the massive crater. The energy needed to lift crater mass M up to vertical distance to the lip D against the force of gravity F = Mg is simply E = FD = MgD. This is just a physical fact of nature. Since for a constant crater radius-to-depth ratio, the mass M is proportional to $D^3$, we get $E \sim D^3D \sim D^4$, hence at high yields the energy used to overcome gravity predominates. The full equation for the utilization of energy is:

$$E = AD^3 + BD^4,$$

where the first term on the right hand side (containing $D^3$) is the energy needed to hydrodynamically excavate the mass of the crater (this energy is directly proportional to the mass of the crater or to the cube of the crater dimensions), and the second term on the right hand side (containing $D^4$) is the energy needed to overcome gravity and dump the excavated soil on the surrounding ground to form the crater lip and ejecta zone. So this is the simplest way to model craters: just use the experimental data to determine the values of constants A and B. Instead of this energy utilization and physical mechanism based approach, Holsapple allows the experimental data to vary the values of the powers that in fact should not be allowed to vary unless the radius-to-depth ratio of the crater varies.

The crater scaling formula that Holsapple gives allows the excavated volume of the crater to vary linearly with bomb yield at low yields ("strength regime"), correctly giving $W^{1/3}$ scaling for linear dimensions, but at high yields it gives a scaling law of $W^{\{mu\}/2}$ where {mu} should theoretically be equal to ½ from the physical laws of nature as they are known for constant radius-to-depth ratio craters to give the $W^{1/4}$ scaling law at high yields (gravity regime). By letting {mu} vary according to the explosive and impact cratering data in his database, however, Holsapple gets differing values for {mu}, from 0.41 for dry soil to 0.55 for wet soils, soft rock, hard soil and hard rock. For {mu} = 0.55, the scaling law for the high yield (gravity regime) asymptote will be $W^{0.55/2} = W^{0.275}$ instead of the physically defensible $W^{1/4}$ which is needed for energy conservation! Moreover, the data in Holsapple's database are mainly data for the strength regime. He doesn't have strong evidence of a departure from the natural $W^{1/4}$ scaling law. So we disagree with the scaling procedure unless {mu} is taken as ½ and the experimental data is just used to constrain the values of the *other* variables in the scaling procedure. The dimensional analysis formula used to interpolate in the all-important transition zone (which spans the most important yield range for nuclear weapons) from strength to gravity scaling, is also suspect, and **we would prefer a simple physical prediction system based on energy utilization between the hydrodynamic break up of the ground and the work against gravity in ejecting debris to form the lip and ejecta zone (as outlined in an earlier post, linked here).**

However, **online calculations using Holsapple's computer program does provide some interesting updates to our information**. Holsapple's computer calculation for explosion cratering works by using an equation based on dimensional analysis and data to predict crater excavation volumes for four different kinds of soil: dry soil, wet soil, hard soil/soft rock, and hard rock. The crater excavation volume is constrained to be directly proportional to bomb yield for very low, sub-kiloton yields (the "strength regime", corresponding to cube-root scaling for linear dimensions such as depth and radius) but less than directly proportion to yield for very high yields such as in the megaton range (the "gravity regime", where we argue that the energy to excavate against gravity is $E = mgh \sim [volume]*[volume]^{1/3} \sim [volume]^{4/3}$ so that $[volume] \sim E^{3/4}$, which makes linear dimensions scale as $E^{1/4}$).

For example, for TNT (not nuclear explosive) surface burst (with the charge half-buried in the ground, so that the centre of the explosion at at ground level), Holsapple's computer program shows that at TNT yields equal to or less than 100 kg, the excavated volume in dry soil is $39{,}570W_{kt}$ cubic metres. But if you increase the yield to 1 kt of TNT explosive, you don't get a crater of 39,570 cubic metres, but only 16,600, because gravity effects are already starting to kick in. This figure of course is bigger than for a nuclear explosion.

Holsapple's model shows that the crater excavation volume for a low weight-to-energy ratio nuclear weapon ($0.4186W_{kt}$ kg bomb mass) is

actually 10 times less than for a high weight-to-energy ratio nuclear weapon ($10W_{kt}$ kg bomb mass) and is 25 times smaller than the crater volume produced by 1 kt of actual TNT ($1{,}000{,}000W_{kt}$ kg bomb mass).

For example, the crater volume for a 1 kt low mass-to-energy ratio nuclear warhead surface burst on dry soil is 664 $m^3$, compared to 6,640 for high mass-to-energy ratio nuclear warhead, and to 16,600 for actual TNT.

The heavier the bomb mass, the more efficient is the cratering effect, because more energy is carried downwards on dense, high-momentum bomb debris that embeds itself into the ground and delivers energy efficiently, unlike the X-ray surface ablation and the blast wave reflection from the ground, which produce a ground shock but no cratering. For the low mass-to-energy ratio nuclear warhead (which produces the significant smallest cratering action) on dry soil, Holsapple's program gives the following crater excavation volumes as a function of total yield:

1 kt: 664 $m^3$
10 kt: 4,680 $m^3$
100 kt: 32,200 $m^3$
1 Mt: 220,000 $m^3$
10 Mt: 1,490,000 $m^3$

Once the volume is calculated by the semi-empirical dimensional scaling equation, the program uses that volume to find the other crater parameters. Holsapple states that the density of dry soil is 1.7 grams/$cm^3$, but calculates the mass of crater ejecta as 80% of that (1.36 grams/$cm^3$) because not all of the crater volume is formed by ejecting material: there is also a soil compression effect below the bomb, and this accounts for the other 20% of the crater mass (which is compressed downward instead of being ejected out of the crater). This 80% figure is applied to all types of soil.

The density of dry soil is 1.70 grams/$cm^3$, but as stated only 80% of the crater volume is ejected so the mass of ejecta per unit volume is 0.8*1.70 = 1.36 grams/$cm^3$. For wet soil, hard rock and soft rock, the density is 2.10 grams/$cm^3$, and the ejected mass to volume ratio is 0.8*2.10 = 1.68 grams/$cm^3$. For hard rock, the mass density is 3.20 grams/$cm^3$, and the ejected mass to volume ratio is 0.8*3.20 = 2.56 grams/$cm^3$.

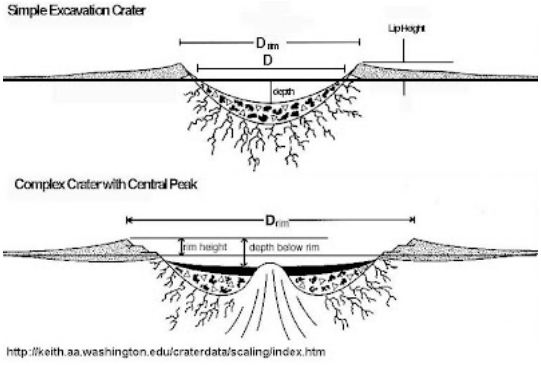
In all cases of weapon type and soil type, Holsapple's model uses the following relationships to calculate crater dimensions from the crater excavation volume $V$:

Apparent crater radius, $R_a = 1.10V^{1/3}$
Rim radius, $R_{rim} = 1.30R_a$
Apparent depth, $D_a = 0.60V^{1/3}$
Average lip height, $H_{lip} = 0.17D_a$
Crater formation time, $T_{formation} = 0.8V^{1/6}/g^{1/2}$ where acceleration due to gravity $g = 9.81$ $ms^{-2}$ for Earth. (Most of the crater volume is ejected within a couple of seconds for any nuclear explosion, since the time taken is a weak function of yield.)

Information on the distribution of crater ejecta velocities is also provided. For a low mass-to-energy ratio nuclear weapon surface burst on dry soil, 50% of the ejecta exceeds 13.5 m/s for 1 kt or 30.1 m/s for 1 Mt.

For extremely high yields, there is a transition to "complex" craters like lunar craters, having a wide shallow basin and a central peak. Complex craters have their shape because they are too large for all the excavated material to be dumped at the lip; the fallback of ejecta in the centre of the crater is then so substantial it causes a central peak in the middle of the crater.

On the Earth, crater exceeding a rim diameter exceeding 1.77 km for dry soil would start to transition into "complex" craters. Obviously, there is a difference in this between Earth and Moon because there are no significant afterwinds in an explosion caused by an impact event on the Moon: there is a lack of atmosphere. But on the Earth, a large explosion near surface level causes a toroidal fireball to form due to air drag on the sphere, and you then get debris being sucked into the toroidal circulation via a mushroom "stem" above ground zero. On the Moon, which has only one-sixth of the surface gravity of the Earth, the transition from simple to complex cratering occurs at a rim diameter of 8.5 km. These complex craters are more relevant to impact cratering **like the K-T event 65.5 million years ago**, than to the relatively trivial energy releases of stockpiled nuclear explosives.




**Peaceful cratering: the U.S. Atomic Energy Commission's *Project PLOWSHARE***

After the fallout from the *CASTLE-BRAVO* 14.8 megaton Bikini Atoll hydrogen bomb produced media hysteria over the effects of thermonuclear weapons, President Eisenhower responded by ordering the development and **testing at Bikini Atoll of *REDWING-NAVAJO* of the 95 % clean 4.5 megaton hydrogen bomb.** Aside from averting collateral damage from fallout in tactical nuclear war to defend Western Europe from invasion by the massive conventional Soviet block armies, this kind of cleaner weapon was also intended for peaceful civil engineering use as a cratering explosive. The first peaceful underground *PLOWSHARE* test in 1957 was such a success that it convinced America to move above ground nuclear testing underground to avoid fallout radiation hazards.

**John Lindsay-Poland's book *Emperors in the jungle: the hidden history of the U.S. in Panama* (2003) gives in Chapter 3, "The Nuclear Canal", a critical but detailed example of another *PLOWSHARE* cratering project in the story of this peaceful use of the clean hydrogen bomb.**

This plan was to set off 275 relatively clean hydrogen bombs to cheaply (at an estimated cost of roughly one billion dollars, which was cheap compared to the cost of using conventional explosives) create a new sea-level (without any locks) Panama canal in the Darien region, near the border with Colombia. The existing Panama canal has locks and isn't at sea-level, so it takes a long time for ships to pass through it, making it slow and expensive for ships to use to cross from the Atlantic to the Pacific Ocean.



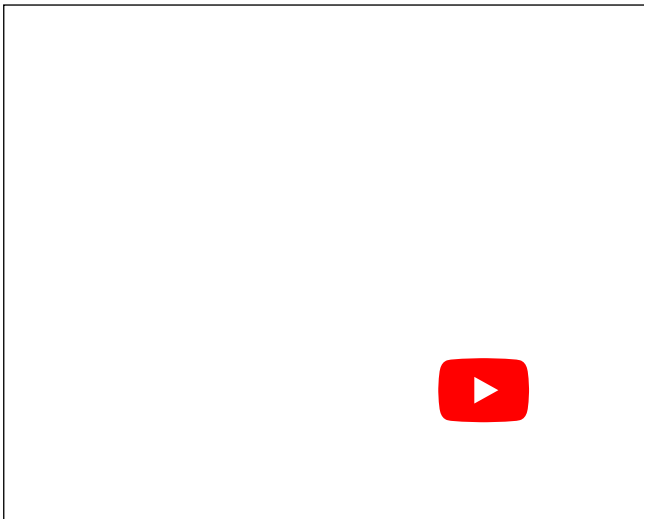
View Larger Map

**Above:** in order to proof-test nuclear cratering for a new Panama canal, the 30 % fission, 104 kt total yield *PLOWSHARE-SEDAN* nuclear test was detonated at 635 feet depth (to optimize cratering efficiency and minimize fallout by trapping the radioactive case shock debris in the crater ejecta) in the dry soil of the Nevada Test Site on July 6, 1962. Although *SEDAN* was a success, the soil around some of the proposed Panama canal routes was not dry soil but saturated clay, which can create a wider, shallower shaped crater than dry soil. Hence, to get the depth required, higher yields than *SEDAN* would have been required for a new Panama canal. This would have increased the distant blast wave refraction effects (downwind of the high altitude winds), the ground shock (earthquake-type) effect, and fallout (although it is easier to reduce fission yield at very large total yields than very small ones, for instance the 50 Mt Soviet test was only 2-3 % fission). Both the distant blast and fallout effects could have been averted by postponing detonation until the winds were blowing out to sea, but ground shock effects from the large number of simultaneous high yield underground nuclear detonations required might have damaged the nearby existing Panama Canal, depending on the exact route taken, the distance, and the distribution of bomb yields used. The project was finally cancelled in 1971 due to **lying propaganda about alleged low-level radiation effects in the popular media.**

**OTHER SOURCES OF INFORMATION ON CRATERING:**

**Patteson, A. W, *Physical Characteristics of Craters from Near-Surface Nuclear Detonations*, report AD0360630, 1960.**

***Proceedings of the Third Plowshare Symposium Engineering with Nuclear Explosives Held in Davis California on April 21-23, 1964*, University of California report ADA396463, 1964.**



Soviet nuclear test. Chagan. Atomic Lake.

*posted by Nuclear Weapons Effects 4:58 pm*

*24 COMMENTS:*

*At **10:18 am**, **nige** said...*

25 January 2011:

I have just deleted a submitted comment which began

"In fact 1000-megaton ground bursts were studied in ca.1958. They described in *The Search for New USAF Weapons, 1958-1959*. (S) Arthur K. Marmor. 1961. 66 pp. But unfortunately this doc. still classified ( I have doc.that cited this). It was predicted very heavy fallout from ca.85% fission 1gt ground burst with lethal exposures in neighbour countries. What you can say about this?"

Please don't anonymously refer to unavailable classified documents and request discussion of what you allege they say.

However, a 1000 megaton surface burst will produce fallout that is distributed by the weather.

The fallout is easier to see and more effectively decontaminated in large quantities like snow, than small quantities of tiny particles that are hard to see and lodge in small (quickly filled up) surface irregularities.

There is extensive data on fallout decontamination beginning with the Jangle Sugar and Uncle nuclear tests in Nevada, 1951.

High yield dirty bombs produce a lot of easily-shielded low gamma ray energy emitters Np-239 and U-237 due to neutron in U-238.

You anti-civil defense guys know nothing about the effectiveness of radiation shielding of improvised cover. Just line some boxes with plastic bags, fill with water, and place on and around a table as far from the outer walls and roof of a building as possible. Arrange furniture around it for further shielding. Build a self-calibrated KFM to measure the radiation dose rate accurately while waiting for the radiation to decay to say 0.5 R/hr (which Glasstone and Dolan state is the threshold for genetic defects in female mice). Then go outside and decontaminate. Google "Dr Carl F. Miller" for more details. There are lots of U.S. Naval Radiological Defense Laboratory reports on different kinds of fallout decontamination effectiveness available now.

*At **11:59 am**, Anonymous said...*

It is referred to in the FOIA declassified report

http://www.governmentattic.org/docs/Guide_USAF_Hist_Lit_1983.pdf

"Guide to Air Force Historical Literature, 1943 – 1983,
29 August 1983"

*At **1:41 pm**, Anonymous said...*

Marmor probably only give a summary of this study or even only ment. this study,since as pages about this weapon.19-21.
Study was done by Air Staff.It was ordered in march 1958 by Gen.T.White(USAF Chief of Staff).
You think that these people were anti-civil defense guys?

As for clean boms-they were only a fake political propaganda .
Clean bomb for same yield would be in 3-5 times heavier than standard bomb.So USAF was no happy with such things.They never been deployed.In fact fallout was considered only as bonus,most strikes that were planned in 1956,1957 SAC plans and SIOP-62 were ground bursts on counterforce targets.20mt was a smallest yield needed to crater runways and this was based on contemporary estimates of size of crater,that were exaggerated.So in fact at this time constraints on fallout were mostly ignored by USAF.Were studies about fallout as primary deterent of general war.But USAF was not interested in this-fallout have been considered only as BONUS EFFECT.This was changed in McNamara era ,but mostly large weapons were replaced with smaller ones or air bursts were used,this again was no place for clean bombs.
Information about MK36Y2 or C with 6 mt yield compared to 19mt or 20mt(mod2) may be fake.

P.S. Total numbe of DGZ in SIOP-62 was 1073,373 were cities (295-Soviet,78 -Chinese).Fatalities were predicted -54% of Soviet population and 16% of Chinese population.

*At **3:24 pm**, **nige** said...*

Anonymous,

You need to press the space bar on your keyboard after typing a comma or full stop, please.

I've read the declassified portions of SIOP-62, and you're wrong.

USAF wanted dirty (U238 tamper) bombs because they gave the biggest total yield per ton of bomb weight for cold war deterrence against a general war.

The SIOP-62 specifies deliberately limiting collateral damage to civilians in friendly neutral countries (maximum permitted outdoor gamma dose = 150 R, which would be reduced to a trivial amount indoors in a well-shielded inner core refuge surrounded by furnishings).

The SIOP-62 does not specify maximizing fallout effects against civilians, which would involve waiting for favorable wind patterns and rain patterns for an attack. This is not done in the plan!

The fallout "bonus" you refer to is fake. They aren't even trying to detonate in blue skies to maximise thermal casualties.

All they plan to optimize are blast and cratering effects against military and key government and industrial/military weapons production factories.

Clean bombs were developed in the shape of the 0.020 kt W-54 Davy Crockett of the 1960s (2,100 deployed to defend Europe) and the 3 kt neutron bomb of the 1980s.

You are very badly informed about the use of clean nuclear weapons. Do you know how the local fallout falls off very rapidly with increasing height of burst? Even when the fireball touched the ground in the 1953 "Grable" canon-shot test (15 kt at 524 feet detonation altitude), only 1% of the bomb debris came down in the local fallout radiation pattern! It was a very clean shot although it was 100% fission!!!!

Same for 1956 3.8 Mt, 50% fission Cherokee air burst at 4,350 ft detonation altitude. Triffet (weapon test report WT-1317) had ships, barges and survey aircraft in the fallout pattern downwind at various distances. Peak dose rate from fallout was just 0.2 mR/hr!!

So don't believe a word Chuck Hansen and Howard Morland write about the inevitably devastating fallout effects of nuclear weapons. They do not write competently on nuclear effects.

*At **4:11 pm**, Anonymous said...*

I'm now very busy....But fallout bonus not fake,see for example:
Letter from Captain John H. Morse, Special Assistant to the Chairman, Atomic Energy Commission, to Lewis Strauss, Chairman, Atomic Energy Commission, 14 February 1957, Secret
Source: Dwight D. Eisenhower Library, Records of Special Assistant for National Security Affairs, NSC Series, Briefing Notes Subseries, box 17, Target Systems (1957-1961)and The Engineer studies center and army analysis. A History of the US Army Engineer Studies center 1943-1982 by William C. Baldwin" .1982 and reference therein about fallout bonus and these studies.

For thermal casualities ,well:The second-strike capability was quite different.11 Dyna Soars and their launch vehicles would form a single unit ;10 would be unmanned and 1 manned control vehicle.Once launched into storage 100 n.m. high
orbit,no futher communications from the ground would be strictly necessary:the 3-man crew would be capable of controling whole unit. Each unmanned Dyna Soar bomber had single 20 megaton (weighning 3500 pounds),a 5000 pounds thrust turbojet and 3000 pounds of fuel.On command,bomber would re-enter,drop to subsonic speed and start the turbojet ,after that it would fly the last 250 miles n.m.at low alltitude (below radar ) using terrain-mapping radar for guidance to within 400 feet of the target.

An alternate version meant for high-altitude detonation (for taking out soft targets,i.e. cities) would delete the jet engine in favor for of a 40 megaton bomb.
Future version (one of many) would be stricly a ORBITAL BOMB with 15000 pound device (compare to 20mt in 3500).

"According one source a single Pluto could carry a 5500-pound payload which could be broken down like this :
1-26megatons
5-1.3 megatons
9-1.1 megatons
14-750 kilotons
16-200 kilotons
36-50 kilotons
42-5 kilotons. "And this only small version larger version with Tory -III reactor could carry 15000-pound payload -or 1 weapon 15000 pounds or 26 1.1mt warheads.And Pluto itself very evil weapon without warheads.
All these high-yield devices 20mt,26,35mt(planned Titan2 warhead),40mt,60mt and at 15000 pound weight (this unclear whether 3500 pounds -device weight ,500 pounds may be drop case weight,such were st. that 60 mt would weigh around 9000 pounds,so then 15000 pounds would have 100mt,even if 3500 and 10500 weights of 20 and 60mt,for 15000 pounds yield would be staggering.) and other belongs to new family of high-yield devices of LLNL in 1962.
And this probably no limit in ratios.It was stated that fission contributions in these weapons decreased to few percents!

Damned McNamara and other illuminati,they canceled all these things!

*At **6:12 pm**, Anonymous said...*

If you not want to publish my comm.for some reason you may say something about means to achieve such high ratios .This data from dec.docs,I'm not have them already ,but i'm have compilation and extraction from them.
So what about 3000-3500 pound 20mt warhead with probably most. from fusion?

*At **9:50 pm**, **nige** said...*

Hi Anonymous,

Again, you need to take a look at the physics of nuclear weapons effects to see why high yield nuclear weapons are extremely ineffective:

1. In a desert over over ocean, the area of overpressure (diffraction) damage scales as yield^(2/3), so if you increase yield 1000 times, the area damaged only increases 100 times. The crater area at very high yields scales as typically yield^(1/2), so increasing yield 1000 times only increases crater areas by 32 times.

2. In a city, the yield scaling is an even weaker function of bomb yield, because of the cumulative loss of energy from the blast in knocking over buildings and accelerating debris. The blast can't cause destruction without energy being lost. This cumulative energy loss gets very large over large areas of buildings for big yields, so the blast loses its power sooner than over a desert or ocean in a test.

3. In a surface burst, there is a massive reduction of thermal radiation due to the cratering and fallout particle melting effects, which uses up fireball energy.

4. As yield increases, the total amount of fission products increases, but the cloud height also increases so that fallout takes longer to arrive near ground zero and more decay occurs in the interim. Similarly, as the downwind distance form any dose rate is increased by bigger yields, the arrival time is also increased since it depends (far downwind) on the windspeed which isn't a function of the bomb power. So the fallout takes longer to arrive, and more of the radiation decays while the fallout is in transit to the distant downwind location. People have time to evacuate if they are downwind, or to improvise good radiation shielding while awaiting fallout arrival. They might even have time to set up hose pipes and "washdown" decontamination gear to wash fallout off buildings as it landed, reducing the roof dose rate. On sloping roofs, water can sometimes be used to wash fallout off. On flat roofs, fallout can be swept off.

Again, I think you are falling for the "sitting duck" fallacy of the 1930s era, when the military and the pacifists both agreed (wrongly!) that if British we fought a preventative war against the Nazis, it would be the worst nightmare possible, with no protection possible against gas, incendiary bombs and high explosives, and a predicted casualty toll of 1 million people in Britain every month.

This prediction was wrong. The Nazis destroyed over a million British houses, but the casualty toll was 60,000, or under 2% of the population whose homes were destroyed. People survived under strong tables, in improvised low-cost shelters, and such like. It's very hard to kill a large percentage of the people with high explosives, gas, or nuclear weapons once they disperse and take good (but cheap and simple) countermeasures. As I blogged in another post about the exaggerations of weapons effects in history, trench shelters allowed the Confederates to stand out the Seige of Petersburg in the American Civil War, 1864-5. They were only defeated when attacked from a flank. This trenches lesson was ignored by German military in their planning for WWI, which was why WWI dragged on in trench war and they lost (they prepared for a short war using big guns for a knockout blow).

Machine guns make soldiers quickly drop down and take cover, stalling a massed attack. They don't mean that you can shoot people who have taken cover. There are limits to all technology in war. What counts as much is having the stamina to hold out, not just hinding behind a big pile of "deterrent weapons" that are completely incredible and useless for deterrence due to political BS.

*At **5:59 pm**, Anonymous said...*

1000-megaton weapon also described in :Lee Bowen and Robert D.Little,History of the Air Force Atomic Energy Program(TS),(AFCHO,1959)Vol.IV pp.486-487,and Hist(TS),Dir/Plans,Jul-Dec 1958,pp.11-14.
Dir/Plans mean Directorate (Director of Plans).
So this device existed on paper.

You,of course right smaller weapons more effectife for MAD,but MAD not existed at this time.
So what would be effects of this weapon on Moscow basine and bunkers?

And you not ask my question -Why in large devices ( with more stages than in smaller ones) ratios higher? Or better, why with adding additional stage ratio increased?

P.S. You blog probably the best source for data on weapon effects in entire WEB.But why only nuclear ? May be effects of chemical and biological weapons would a better addition,since as they much cheaper and better accessible for terrorists.

*At **7:17 pm**, **nige** said...*

Generally you'd expect efficiency to be maximized in high yield devices because the bomb reaches higher temperatures and pressures, allowing a greater percentage of the deuterium and tritium to be fused, and the neutron fluence is greater, allowing a greater proportion of the fissionable material (i.e. lithium isotopes, plutonium and uranium) to be fissioned.

However, this increase in efficiency is obviously limited for several reasons at very high yields. Suppose a 10 kt bomb can achieve an efficiency of say 50% of its fissionable nuclei fissioned, then the maximum increase in efficiency at higher yields is only a factor of 2.

Once efficiency gets high, it can't be increased any more.

Secondly, at high yields you may end up with more lithium splitting into tritium which upon fusion with deuterium gives a 14.8 MeV neutron. These high-energy neutrons are very liable to undergo a (n,2n) reaction with uranium-238, which reduces the efficiency of the fission of uranium-238. You end up with neutrons being absorbed without causing fission, so the yield to weight ratio can't rise any higher.

*At **7:23 pm**, **nige** said...*

Yes, I have also got the facts on the exaggeration of chemical, biological and more importantly, conventional weapons effects. All of these are exaggerated in the sense that proper improvised countermeasures and realistic weather conditions with realistic population locations and dispersion, show the effects are trivial. This is why the Japanese cult used sarin on the underground, a confined space.

The reason I'm concentrating this blog on nuclear weapons effects exaggerations is that there is less bias against the possibility of protecting people against the other threats. Nuclear weapons are a special case of exaggerations because they really CAN DO A LOT OF DAMAGE AND CAUSE A LOT OF CASUALTIES if people are unprepared.

Chemical, biological and conventional protective emergency improvised actions are not very different to those against nuclear weapons effects. However, I'm detailing all of the efficiency factors for different protective actions in civil defence in the new free PDF book I'm preparing.

*At **8:51 pm**, **Anonymous** said...*

Thanks.....You are proved that I'm expected.

*At **7:45 am**, **Anonymous** said...*

Close, I'm believe that this device close resembles 1000-mt Alarm clock with same dimensions and using 100mt triger( weighning around 38kpa-in fact 40mt,60mt and100mt were prepared for Hardtrack,but were canceled by Rabi ).There are some evidence that large number of such TN systems have been studied in 1950-s,but unfortunately none of them ever materialized.
Consider a new ones.Mk-6 RV was designed to deliver a 6400 p.warhead,35 mt warhead have been designed in 1962 in that in mind,i.e. its weight would be 6125pounds,this absurd if they construct 5250pond
.For DS-1 -its unmanned,150,000 feet detonation,payload given as 7000 pound,so 40mt weighing 7000 pounds.20mt warhead was sucessor for W-38,26mt unknown ca.4000 pound 10mt warhead,35mt for mk-53,60mt for mk-41 and etc.More amazing that 20mt warhead would be warhead of Advanced Minuteman,probbly in MK-17 RV.But I'm not understand way to achieve such ratios- 12.6kt/kg."The fact that tests were conducted of designs which could lead to an entirely new class of U.S. weapons which could have relatively low weights and extremely high yields, with the fission contributions decreased to only a few percent of the total yield. (63-1) (See also V.B.5.b.)

9. The fact that the yield-to-weight ratios of the new class of weapons would be more than twice that which can now be achieved in the design of very high yield weapons using previously developed concepts".
One guy said :"According to Lawrence Livermore National Labs, advances were made in very high yield devices (over 25 megatons) such that in 1962, they had the capability to build a 60 megaton device with a weight of around 9000 lbs, and the device would be 95%+ fusion; just as the Tsar Bomba was".
I'm not understand this.Without u-238?

*At **2:06 pm**, **Anonymous** said...*

Also note that CIA estimates weight of Tsar Bomb as 17500 pounds,not 26.5 tons.They believed that it can be warhead for UR-500 missile.This is caused some confuse in open sources.In reality Soviets planned 30-megaton warhead for this missile,probably weighing 7500kg.

*At **4:51 am**, **Anonymous** said...*

MK-17 vehicle described as standard RV to deliver perhaps this 20mt warhead,on Improved Minuteman.

But Advanced Minuteman RV (As well Advanced Titan 2 RV) described as Marv,maybe this data declassified today and shelved

somewhere .
A.Titan 2 vehicle for class B warhead,this would mean ca.60mt weapon.

More interesting project was sea-based Advanced Polaris A-4.
Loadings roughly same as small land -based Pluto.So why 42 5kt warheads on single vehicle they considered ?To take troop formations?
As for large Pluto .Some says that contamination from jet would be great(600MW reactor),as well sonic boom from 28m long vehicle,flying at 150m at 3.5 M.
What you would say about Pluto?At the end of mission (with multiple warheads) Pluto would crushed to surface and reactor would be overloaded and detonated.What you would say about it?As for detonation of single warhead ? Material of the reactor also would be fissioned ?

For large Pluto warhead was 75 megatons.

*At **4:55 pm**, MABUS said...*

1,000-megaton was a Livermore design.

From the Chuck Hansen's Swords

"In terms of extremely-high yield warheads, DOD had at this time a standing requirement for a 100 MT weapon within prescribed volume and weight limits. Even larger yields were believed possible: a report prepared by UCRL discussed the feasibility of a 1,000 MT warhead.224 (This was reminiscent of Dr. Edward Teller's July 1954 proposal for a 10,000 MT weapon.)"

What would be area contaminated to 1000R 96-hour dose outdoors from 1000-megaton surface burst.

*At **5:39 pm**, **nige** said...*

"What would be area contaminated to 1000R 96-hour dose outdoors from 1000-megaton surface burst."

In Glasstone and Dolan, the outside 1000 R 96-hour dose contour for Castle-Bravo (15 megatons total yield, about 10 megatons of which was fission) is 160 miles long and up to 32 miles wide, covering an area of roughly (Pi/4)*160*32 = 4,000 square miles.

However, this area for 1000 R does not scale up directly with bomb power, because it takes more and more time for fallout to arrive over the bigger downwind areas from higher yields, so more decay occurs during this extra arrival time.

The downwind distances and widths of imaginary "1 hour reference dose rates" (which never occur for downwind locations with fallout arrival times longer than 1 hour) scale roughly as {yield}^0.5 (so that areas for imaginary 1 hour reference dose rates scale directly with yield).

So, if the effective (median) fallout arrival time at a location is directly proportional to the downwind distance, the arrival time will also scale as {yield}^0.5.

The 96 hour dose is D = 5{R_1}(t^{-0.2} - 96^{-0.2}), and the infinite time dose is D = 5{R_1}t^{-0.2}, where R_1 is the imaginary 1-hour reference dose rate and t is the arrival time.

Hence, the average infinite time dose (about 60% of which is received in 96 hours for 1 hour arrival time) covering an area that is directly with yield will only increase as {yield}^(-0.5*0.2) or as {yield}^-0.1.

So if 1000 R outdoors over 4,000 square miles for 10 mt fission is scaled to 1000 mt, you get a dose of 630 R outdoors over 400,000 square miles. However, it's easy to get a protection factor of at least 10 inside a modern building.

*At **2:44 pm**, Anonymous said...*

35 -megaton warhead for Titan II apparently described in the document :MEMO FOR MEMBERS, MLC, WARHEAD FOR THE TITAN II .

Author(s): BAKER, E.E. (* AEC AND DEPARTMENT OF DEFENSE) ; LUEDECKE, A.R. (AEC-ATOMIC ENERGY COMMISSION, THE U.S.)

Addressee: UNK; BROWN H.

Publication Date: 1962 Sep 18 .

OpenNet Entry Date: 1994 Aug 26 .

I'm have plans to find its copy in closest future.

*At **1:15 pm**, Anonymous said...*

Only very first details about these warheads declassified.

The main SAC requirement after Soviet 50Mt test was a 150-megaton
warhead (25,000 pounds) i.e. Class A weapon,it cannot be delivered by bombers,so it was a military version of Titan III(1962).

But with gelled propellant and with a solid booster named Titan-2A,that itself was a ICBM.

I'm not find numbers for this baby that Lemay and Tommy Power wanted yet,but Tommy wanted 10 000 Minuteman ICBM.....

It also must be pointed out,that however , traitors -JFK and Mcnamara canceled the Atmospheric development tests for devices (up to 1000MT-yes, this was a Teller,LLNL and USAF scientists's initiative) during Dominic,it was possible to test these warheads (20-150MT) undeground at very reduced yields ,around 1 megaton.

*At **11:44 pm**, Anonymous said...*

Regardless of what people think of nuclear weapon capabilities, a 10 megaton thermonuclear bomb (which is several times more powerful than Fat Man and Little Boy) always vaporize everything in the ground zero leaving no remains.

*At **1:54 pm**, **nige** said...*

Not if it is air burst to maximise thermal radiation effects and blast damage to wooden houses! You cannot fit a 10 megaton warhead into a MIRVed missile or any SLBM warhead anyhow. You need a missile the size of a space rocket, like the old Titan II, to deliver that size warhead. Even if you have a ground burst, only about 1% of the crater is even melted as proved by Miller's USNRDL-466 report data on fallout specific activity, and far less than that is vaporized. This is why the concrete shelters at the crater edge remained, unvaporized. The vaporization propaganda myth started with the airbrushing out of the surviving concrete buildings near ground zero, where only 0.1 mm thickness of roof tiles was ablated!

*At **2:11 pm**, **masterco93** said...*

You mentioned before that in both Koa and Seminole nuclear tests, the device was detonated in water tank to incease the cratering. I understand that the more massive the nuclear device, the more energy you get in form of kinetic energy instead of heat which equals more cratering. But why exactly water ?
In other words, what does water do better than the few cubic meters of soil/rock in the very close proximity to the device given that both water and rock are good absorbers of X-rays ?

*At **11:42 am**, **nige** said...*

Water tanks were used because water has a standard density of 1 metric ton per cubic metre, to test the theory that putting more mass around the bomb puts more energy into cratering phenomena. You can read about it in the declassified cratering and general effects reports for Operations Redwing (1956) and Hardtack (1958).

If they had merely bulldozed coral sand around the bombs, there would have been the issue of the exact bulk density (air spaces inside the soil reduce the density, so the effective density depends on how compacted the soil is, introducing more complexity).

*At **1:00 am**, **masterco93** said...*

But regardless of the complexity of finding out the effective density, adding mass of a material with good absorption of X-rays around the bomb mean more cratering. Is that correct ?

*At **12:01 pm**, **nige** said...*

Exactly: a really thick mass around the bomb can convert most of the X-ray energy into hydrodynamic energy, thus increasing the crater, throwout, and ground shock effects.

**Post a Comment**

Enter comment

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- **Glasstone's fake nuclear weapon data for unobstructed terrain debunked for cities! Realistic effects and credible nuclear weapon capabilities for deterring or stopping aggressive invasions and attacks which could escalate into major conventional or nuclear wars. Credible nuclear deterrence of invasions and conventional wars reduce the risk of large conventional and nuclear wars occurring through escalation of invasions such as the invasion of Belgium in 1914 and the invasion of Poland in 1939, of surprise attacks like those against France in 1940 and of Russia and Pearl Harbor in 1941, Afghanistan in 1979, Kuwait in 1990, or Crimea in 2014. Contrary to irrational, pseudo-scientific propaganda, the number of nuclear weapons is smaller than the millions of conventional weapons used in large wars and the correct scaling shows that the overall effects are similar, not massively different as often claimed for political propaganda by enemies of peace. Furthermore, the greater time delay of effects from nuclear weapons over the damaged area increases the efficiency of cheap civil defence countermeasures, as compared to conventional weapons. We need credible effects of nuclear weapons for real world peace: peace through tested, proved and practical declassified deterrence and countermeasures against collateral damage. Credible deterrence through simple, effective protection against concentrated and dispersed invasions and aerial attacks. Discussions of the facts as opposed to inaccurate, misleading lies of the "disarm or be annihilated" political dogma variety. Hiroshima and Nagasaki anti-nuclear propaganda debunked by the hard facts. Walls not wars. Walls bring people together by stopping divisive terrorists. In conclusion, credible nuclear deterrence of conventional war offers a beautiful opportunity to create a peaceful world, free from fear peddling, ranting dictators. The only oppositions you will meet will come from authoritarian obsessed fear peddling myth makers. If they can't tell the truth and face the facts, why listen to them? Please see our post on the need to *deter not only direct threats from nuclear attacks but also conventional wars and invasions* that can *escalate* into nuclear wars (as proved by the use of nuclear weapons in WWII, for example, after they were developed during the war itself and did not trigger or provoke the war), linked here, here, here, and here, here, here, and the true scaling law equivalence between a few thousand nuclear weapons and the several million tons of small conventional weapons in a non-nuclear world war as proved by our post summarising key points in Herman Kahn's much-abused call for credible deterrence, *On Thermonuclear War,* linked here. Peace comes through tested, proved and practical declassified countermeasures against the effects of nuclear weapons, chemical weapons and conventional weapons. Credible deterrence to end invasions and wars comes through simple, effective protection against invasions like low yield tactical weapons and walls, and civil defence against collateral damage. Peace comes through discussions of the facts as opposed to inaccurate, misleading lies of the "disarm or be annihilated" political dogma variety, which are designed to exploit fear to close down criticisms of errors in mainstream orthodoxy. In particular, please see the post linked here on EMP results from an actual Russian 300 kt test at 290 km altitude over unwarned civilian infrastructure in Kazakhstan on 22 October 1962, which caused no injuries or deaths whatsoever (contrary to all of Jeremy Corbyn and CND style lying propaganda that any use of nuclear weapons on civilians would automatically kill millions), but shut down the communications and power supply lines! This is not secret, but does not make newspaper headlines to debunk CND style dogmas on the alleged incredibility of nuclear deterrence.**

- **Hiroshima's air raid shelters were unoccupied because Japanese Army officers were having breakfast when B29s were detected far away, says Yoshie Oka, the operator of the Hiroshima air raid sirens on 6 August 1945...**

- **In a sample of 1,881 burns cases in Hiroshima, only 17 (or 0.9 percent) were due to ignited clothing and 15 (or 0.7%) were due to the firestorm flames...**

- **Dr Harold L. Brode's new book, Nuclear Weapons in ...**

- **800 war migrants drowned on 22 April by EU policy:...**

- **Photographed fireball shielding by cloud cover in ...**
- **Nuclear weapons effects "firestorm" and "nuclear w...**
- **Proved 97.5% survival in completely demolished houses ...**

**How to achieve peace through tested, proved and practical declassified countermeasures against the effects of nuclear weapons, chemical weapons and conventional weapons. Credible deterrence through simple, effective protection against invasions and collateral damage. Discussions of the facts as opposed to inaccurate, misleading lies of the "disarm or be annihilated" political dogma variety. Hiroshima and Nagasaki anti-nuclear propaganda debunked by the hard facts. Walls not wars. Walls bring people together by stopping attacks by "divide and rule" style divisive terrorists, contrary to simplistic Vatican propaganda.**

**"There has never been a war yet which, if the facts had been put calmly before the ordinary folk, could not have been prevented." - British Foreign Secretary Ernest Bevin, House of Commons Debate on Foreign Affairs, Hansard, 23 November 1945, column 786 (unfortunately secret Cabinet committees called "democracy" for propaganda purposes have not been quite so successful in preventing war). Protection is needed against collateral civilian damage and contamination in conventional, chemical and nuclear attack, with credible low yield clean nuclear deterrence against conventional warfare which, in reality (not science fiction) costs far more lives. Anti scientific media, who promulgate and exploit terrorism for profit, censor (1) vital, effective civil defense knowledge and (2) effective, safe, low yield air burst clean weapons like the Mk54 and W79 which deter conventional warfare and escalation, allowing arms negotiations from a position of strength. This helped end the Cold War in the 1980s. Opposing civil defense and nuclear weapons that really deter conventional war, is complacent and dangerous.**

**War and coercion dangers have not stemmed from those who openly attack mainstream mistakes, but from those who camouflage themselves as freedom fighters to ban such free criticism itself, by making the key facts seem taboo, without even a proper debate, let alone financing research into unfashionable alternatives. Research and education in non-mainstream alternatives is needed before an unprejudiced debate, to establish all the basic facts for a real debate. "Wisdom itself cannot flourish, nor even truth be determined, without the give and take of debate and criticism." – Robert Oppenheimer (quotation from the H-bomb TV debate hosted by Eleanor Roosevelt, 12 February 1950).**

**"Apologies for freedom? I can't handle this! ... Deal from strength or get crushed every time ... Freedom demands liberty everywhere. I'm thinking, you see, it's not so easy. But we have to stand up tall and answer freedom's call!" – Freedom Kids**

**CONVENTIONAL WARS HAVE KILLED TENS OF MILLIONS OF PEOPLE, NUCLEAR WEAPONS CAN RAPIDLY DETER THIS REAL THREAT TO PEACE WITH MINIMAL CASUALTIES. 'During the critical period 8-15 February [1968], the U.S. command realized [that conventional] bombing was not sufficiently effective. ... The air campaign dropped over 110,000 tons of bombs and napalm on the area around Khe Sanh during the 77-day siege ... the most heavily bombed target in the history of conventional warfare.' – W. C. Yengst, S. J. Lukasik, and M. A. Jensen, *Nuclear Weapons that went to War,* SAID report DSWA-TR-97-25, September 1998 (quoted in the 2015 book by the secret *Capabilities of Nuclear Weapons* editor, Dr Harold L. Brode, *Nuclear Weapons in the Cold War,* page 287). British Nuclear Test Civil Defence Research**

SECRET

DR. PENNEY'S DRAFT BROADCAST

Recorded: 30 October 19

When the planning began, a lot of thought was given to which type of explosion would provide information and experie the greatest value. Purely scientific measurements are most made when the weapon is placed at the top of a high tower, bu were other weighty considerations. The Civil Defence author this country badly needed more data about atomic explosions a accordingly, the test was planned to get as much novel inform

CHANGE 1

Field Manual No 101-31-1

## NUCLEAR WEAPONS EMPLOYMENT DOCTRINE AND PROCEDURES

Radius of vulnerability (emergency risk criterion: 5% combat ineffec

**Figure 54. Radii of Vulnerability.**

| CATEGORY | PERSONNEL (LL) IN— (Based on Governing Effect) | | | | |
|---|---|---|---|---|---|
| Radii listed are distances at which a 5 percent incidence of effect occurs. HOB used is $60W^{1/3}$ meters. | | | | | |
| Yield (KT) | Open | Open Foxholes | APCs | Tanks | Earth Shelter |
| | (Distances are in meters) | | | | |
| 0.1 | 700 | 600 | 600 | 500 | 300 |
| 1 | 1200 | 900 | 900 | 800 | 500 |
| 10 | 3200 | 1300 | 1300 | 1250 | 900 |
| 20 | 4000 | 1500 | 1450 | 1400 | 1000 |
| 100 | 8000 | 1900 | 1800 | 1800 | 1400 |
| 200 | 12000 | 2000 | 1900 | 1900 | 1500 |
| 300 | 14000 | 2100 | 1950 | 1950 | 1600 |

Protective factor = ratio area of effect in the op area of effect for shelte

Example: for 300 kt, the protective factor of open foxholes is equal to $(14,000)^2/(2,100)^2 = 44$.

| Open | Open Foxholes | APCs | Tanks | Ea Sh |
|---|---|---|---|---|
| 1 | 1.36 | 1.36 | 1.96 | 5 |
| 1 | 1.78 | 1.78 | 2.25 | 5 |
| 1 | 6.06 | 6.06 | 6.55 | 12 |
| 1 | 7.11 | 7.61 | 8.16 | 16 |
| 1 | 17.7 | 19.8 | 19.8 | 32 |
| 1 | 36.0 | 39.9 | 39.9 | 64 |
| 1 | 44.4 | 51.5 | 51.5 | 76 |

Calculation of the injury-averting protective factors by simple open foxholes and earth sh function of weapon yield. Most countermeasures are relatively ineffective against tactico wapons (due to the predominating neutron radiation effect at 0.1 kt yield), but are extrem against strategic nuclear weapons with yields of 100, 200 and 300 kt (protective factors of

The definition of protective factor used here is the factor by which casualties numbers are

**Richard P. Feynman, 'This Unscientific Age', in *The Meaning of It All,* Penguin Books, London, 1998, pages 106-9:**

**'Now, I say if a man is absolutely honest and wants to protect the populace from the effects of radioactivity, which is what our scientific friends often say they are trying to do, then he should work on the biggest number, not on the smallest number, and he should try to point out that the [natural cosmic] radioactivity which is absorbed by living in the city of Denver is so much more serious [than the smaller doses from nuclear explosions] ... that all the people of Denver ought to move to lower altitudes.'**

*"If a man reads or hears a criticism of anything in which he has an interest, watch ... if he shows concern with any question except 'is it true?' he thereby reveals that his own attitude is unscientific. Likewise if ... he judges an idea not on its merits but with reference to the author of it; if he criticizes it as 'heresy'; if he argues that authority must be right because it is authority ... The path of truth is paved with critical doubt, and lighted by the spirit of objective enquiry... the majority of people have resented what seems in retrospect to have been purely matter of fact ... nothing has aided the persistence of falsehood, and the evils resulting from it, more than the unwillingness of good people to admit the truth ... the tendency continues to be shocked by natural comment, and to hold certain things too 'sacred' to think about. ... How rarely does one meet anyone whose first reaction to anything is to ask: 'is it true?' Yet, unless that is a man's natural reaction, it shows that truth is not uppermost in his mind, and unless it is, true progress is unlikely."*

**- Sir Basil Henry Liddell Hart, *Why Don't We Learn from History?,* PEN Books, 1944; revised edition, Allen and Unwin, 1972.**

***Civil defense countermeasures, to be taken seriously by the population, require the publication of solid facts with the scientific evidence to support those facts against political propaganda to the contrary. Secrecy over the effects of nuclear weapons tests does not hinder plutonium and missile production by rogue states, but it does hinder civil defense countermeasures, by permitting lying political propaganda to go unopposed (see linked post, here).***

**Terrorists successfully prey on the vulnerable. The political spreading of lies concerning threats and the alleged 'impossibility' of all countermeasures, terrorizing the population in order to 'justify' supposedly pro-peace disarmament policies in the 1920s-1930s, resulted in the secret rearmament of fascist states which were terrorizing the Jews and others, eventually leading to World War II.**

**Political exaggerations about nuclear weapons effects today:**

**(1) encourage terrorist states and other groups to secretly invest in such weapons to use either for political intimidation or for future use against countries which have no countermeasures, and**

**(2) falsely dismiss, in the eyes of the media and the public, cheap relatively effective countermeasures like civil defense and ABM.**

**Therefore, doom-mongering media lies *make us vulnerable to the proliferation threat* today in two ways, just as they led to both world wars:**

**(1) Exaggerations of offensive technology and a down-playing of simple countermeasures such as trenches, encouraged belligerent states to start World War I in the false belief that modern technology implied overwhelming firepower which would terminate the war quickly on the basis of offensive preparedness: if the facts about simple trench countermeasures against shelling and machine guns during the American Civil War had been properly understood, it would have been recognised by Germany that a long war based on munitions production and logistics would be necessary, and war would have been seen to be likely to lead to German defeat against countries with larger overseas allies and colonies that could supply munitions and the other resources required to win a long war.**

**(2) Exaggerations of aerial bombardment technology after World War I led to disarmament 'supported by' false claims that it was impossible to have any defense against a perceived threat of instant annihilation from thousands of aircraft carrying gas and incendiary bombs, encouraging fascists to secretly rearm in order to successfully take advantage of the fear and vulnerability caused by this lying political disarmament propaganda.**

**Contrived dismissal of civil defense by Marxist "Cambridge Scientists Anti-War Group" bigots: (a) appeased war-mongering enemies, and (b) maximised war mortality rates. Idealism kills. Super effective, fully proof-tested, cheap civil defense makes nuclear deterrence credible to stop conventional war devastation by avoiding collateral damage, tit-for-tat retaliation and escalation.**

**Historically, it has been proved that having weapons is not enough to guarantee a reasonable measure of safety from terrorism and rogue states; countermeasures are also needed, both to make any deterrent credible and to negate or at least mitigate the effects of a terrorist attack. Some people who wear seatbelts die in car crashes; some people who are taken to hospital in ambulances, even in peace-time, die. Sometimes, lifebelts and lifeboats cannot save lives at sea. This lack of a 100% success rate in saving lives doesn't disprove the value of everyday precautions or of hospitals and medicine. Hospitals don't lull motorists into a false sense of security, causing them to drive faster and cause more accidents. Like-minded 'arguments' against ABM and civil defense are similarly vacuous.**

**'As long as the threat from Iran persists, we will go forward with a missile system that is cost-effective and proven. If the Iranian threat is eliminated, we will have a stronger basis for security, and the driving force for missile-defense construction in Europe will be removed.'**

**- President Obama, Prague Castle, Czech Republic, 4 April 2009.**

**Before 9/11, Caspar Weinberger was quizzed by skeptical critics on the BBC News program *Talking Point, Friday, May 4, 2001: Caspar Weinberger quizzed on new US Star Wars ABM plans:***

**'The [ABM] treaty was in 1972 ... The theory ... supporting the ABM treaty [which prohibits ABM, thus making nations vulnerable to terrorism] ... that it will prevent an arms race ... is perfect nonsense because we have had an arms race all the time we have had the ABM treaty, and we have seen the greatest increase in proliferation of nuclear weapons that we have ever had. ... So the ABM treaty preventing an arms race is total nonsense. ...**

**'You have to understand that without any defences whatever you are very vulnerable. It is like saying we don't like chemical warfare - we don't like gas attacks - so we are going to give up and promise not to have any defences ever against them and that of course would mean then we are perfectly safe. ...**

**'The Patriot was not a failure in the Gulf War - the Patriot was one of the things which defeated the Scud and in effect helped us win the Gulf War. One or two of the shots went astray but that is true of every weapon system that has ever been invented. ...**

**'The fact that a missile defence system wouldn't necessarily block a suitcase bomb is certainly not an argument for not proceeding with a missile defence when a missile that hits can wipe out hundreds of thousands of lives in a second. ...**

**'The curious thing about it is that missile defence is not an offensive weapon system - missile defence cannot kill anybody. Missile defence can help preserve and protect your people and our allies, and the idea that you are somehow endangering people by having a defence strikes me almost as absurd as saying you endanger people by having a gas mask in a gas attack. ...**

**'President Bush said that we were going ahead with the defensive system but we would make sure that nobody felt we had offensive intentions because we would accompany it by a unilateral reduction of our nuclear arsenal. It seems to me to be a rather clear statement that proceeding with the missile defence system would mean fewer arms of this kind.**

**'You have had your arms race all the time that the ABM treaty was in effect and now you have an enormous accumulation and increase of nuclear weapons and that was your arms race promoted by the ABM treaty. Now if you abolish the ABM treaty you are not going to get another arms race - *you have got the arms already there* - and if you accompany the missile defence construction with the unilateral reduction of our own nuclear arsenal then it seems to me you are finally getting some kind of inducement to reduce these weapons.'**

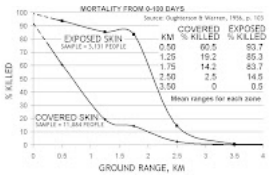
***Before the ABM system is in place, and afterwards if ABM fails to be 100% effective in an attack, or is bypassed by terrorists using a bomb in a suitcase or in a ship, civil defense is required and can be effective at saving lives:***

**'Paradoxically, the more damaging the effect, that is the farther out its lethality stretches, the more can be done about it, because in the last fall of its power it covers vast areas, where small mitigations will save very large numbers of people.'**

**- Peter Laurie, *Beneath the City Streets: A Private Inquiry into the Nuclear Preoccupations of Government,* Penguin, 1974.**

**'The purpose of a book is to save people [the] time and effort of digging things out for themselves. ... we have tried to leave the reader with something tangible – what a certain number of calories, roentgens, etc., means in terms of an effect on the human being. ... we must think of the people we are writing for.'**

**– Dr Samuel Glasstone, DSc, letter dated 1 February 1957 to Colonel Dent L. Lay, Chief, Weapons Effects Division, U.S. Armed Forces Special Weapons Project, Washington, D.C., pages 2 and 4, concerning the preparation of *The Effects of Nuclear Weapons*.**




**Glasstone and Dolan stated in *The Effects of Nuclear Weapons* (1977), Table 12.17 on page 546, that the median distance in Hiroshima for survival after 20 days was 0.12 miles for people in concrete buildings and 1.3 miles for people standing outdoors. Therefore the median distances for survival in modern city buildings and in the open differed by a factor of 11 for Hiroshima; the difference in areas was thus a factor of $11^2$ or about 120. *Hence, taking cover in modern city buildings reduces the casualty rates and the risks of being killed by a factor of 120 for Hiroshima conditions, contrary to popular media presented political propaganda that civil defence is hopeless*. This would reduce 120,000 casualties to 1,000 casualties.**

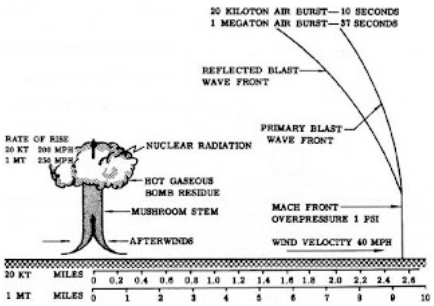
**From Dr Glasstone's *Effects of Nuclear Weapons* (1962/64 ed., page 631): 'At distances between 0.3 and 0.4 mile from ground zero in Hiroshima the average survival rate, for at least 20 days after the nuclear explosion, was less than 20 percent. Yet in two reinforced concrete office buildings, at these distances, almost 90 percent of the nearly 800 occupants survived more than 20 days, although some died later of radiation injury. Furthermore, of approximately 3,000 school students who were in the open and unshielded within a mile of ground zero at Hiroshima, about 90 percent were dead or missing after the explosion. But of nearly 5,000 students in the same zone who were shielded in one way or another, only 26 percent were fatalities. ... survival in Hiroshima was possible in buildings at such distances that the overpressure in the open was 15 to 20 pounds per square inch. ... it is evident ... that the area over which protection could be effective in saving lives is roughly eight to ten times as great as that in which the chances of survival are small.'**

**Lord Mayhew, House of Lords debate on Civil Defence (General Local Authority Functions) Regulations, Hansard, vol. 444, cc. 523-49, 1 November 1983: '... if there had been effective civil defence at Hiroshima probably thousands of lives would have been saved and much human suffering would have been avoided. There is no question about it. ...'**

**Since the 1977 update by Glasstone and Dolan, extensive new updates to EM-1 for a further revised edition of *The Effects of Nuclear Weapons* have not actually been published with unlimited public distribution, due to President Carter's 1979 executive order which transferred responsibility for civil defense from the jurisdiction of the U.S. Department of Defense's Defense Civil Preparedness Agency to the new agency (which is not an Agency of the U.S. Department of Defense, and is not concerned with the analysis of nuclear weapons test effects data), the Federal Emergency Management Agency. However, the February 1997 U.S. Department of Defense's Defense Special Weapons Agency 0602715H RDT&E Budget Item Justification Sheet (R-2 Exhibit) states that a revision of Glasstone and Dolan's unclassified *Effects of Nuclear Weapons* was budgeted for 1997-9:**

**"FY 1997 Plans: ... Provide text to update Glasstone's book, *The Effects of Nuclear Weapons,* the standard reference for nuclear weapons effects. ... Update the unclassified textbook entitled, *The Effects of Nuclear Weapons.* ... Continue revision of Glasstone's book, *The Effects of Nuclear Weapons,* the standard reference for nuclear weapons effects. ... FY1999 Plans ... Disseminate updated *The Effects of Nuclear Weapons.*"**

**The new publications are either classified or unclassified with limited distribution restrictions (e.g., Bridgman's *Introduction to the Physics of Nuclear Weapons Effects,* which includes several chapters on nuclear weapons design to enable initial radiation outputs to be calculated precisely) which prevents up-to-date basic nuclear effects information to justify civil defense against the latest nuclear threats from being widely disseminated; the books are printed for use only by government agencies. The problem with this approach is that widespread public understanding of the best information for civil defense countermeasures is prevented.**




**'The evidence from Hiroshima indicates that blast survivors, both injured and uninjured, in buildings later consumed by fire [caused by the blast overturning charcoal braziers used for breakfast in inflammable wooden houses filled with easily ignitable bamboo furnishings and paper screens] were generally able to move to safe areas following the explosion. Of 130 major buildings studied by the U.S. Strategic Bombing Survey ... 107 were ultimately burned out ... Of those suffering fire, about 20 percent were burning after the first half hour. The remainder were consumed by fire spread, some as late as 15 hours after the blast. This situation is not unlike the one our computer-based fire spread model described for Detroit.'**

**- Defense Civil Preparedness Agency, U.S. Department of Defense, *DCPA Attack Environment Manual, Chapter 3: What the Planner Needs to Know About Fire Ignition and Spread,* report CPG 2-1A3, June 1973, Panel 27.**

***The Effects of the Atomic Bomb on Hiroshima, Japan,* US Strategic Bombing Survey, Pacific Theatre, report 92, volume 2 (May 1947, secret):**

**Volume one, page 14:**

**"... the city lacked buildings with fire-protective features such as automatic fire doors and automatic sprinkler systems", and pages 26-28 state the heat flash in Hiroshima was only:**

**"... capable of starting primary fires in exposed, easily combustible materials such as dark cloth, thin paper, or dry rotted wood exposed to direct radiation at distances usually within 4,000 feet of the point of detonation (AZ)."**

**Volume two examines the firestorm and the ignition of clothing by the thermal radiation flash in Hiroshima:**

**Page 24:**

**"Scores of persons throughout all sections of the city were questioned concerning the ignition of clothing by the flash from the bomb. ... Ten school boys were located during the study who had been in school yards about 6,200 feet east and 7,000 feet west, respectively, from AZ [air zero]. These boys had flash burns on the portions of their faces which had been directly exposed to rays of the bomb. The boys' stories were consistent to the effect that their clothing, apparently of cotton materials, 'smoked,' but did not burst into flame. ... a boy's coat ... started to smoulder from heat rays at 3,800 feet from AZ." [Contrast this to the obfuscation and vagueness in Glasstone, *The Effects of Nuclear Weapons*!]**

**Page 88:**

**"Ignition of the City. ... Only directly exposed surfaces were flash burned. Measured from GZ, flash burns on wood poles were observed at 13,000 feet, granite was roughened or spalled by heat at 1,300 feet, and vitreous tiles on roofs were blistered at 4,000 feet. ... six persons who had been in reinforced-concrete buildings within 3,200 feet of air zero stated that black cotton blackout curtains were ignited by radiant heat ... dark clothing was scorched and, in some cases, reported to have burst into flame from flash heat [*although as the 1946 unclassified USSBS report admits, most***

***immediately beat the flames out with their hands without sustaining injury, because the clothing was not drenched in gasoline, unlike peacetime gasoline tanker road accident victims*]**

**"... but a large proportion of over 1,000 persons questioned was in agreement that a great majority of the original fires was started by debris falling on kitchen charcoal fires, by industrial process fires, or by electric short circuits. Hundreds of fires were reported to have started in the centre of the city within 10 minutes after the explosion. Of the total number of buildings investigated [135 buildings are listed] 107 caught fire, and in 69 instances, the probable cause of initial ignition of the buildings or their contents was as follows: (1) 8 by direct radiated heat from the bomb (primary fire), (2) 8 by secondary sources, and (3) 53 by fire spread from exposed [wooden] buildings."**

**'It is true that the Soviets have tested nuclear weapons of a yield higher than that which we thought necessary, but the 100-megaton bomb of which they spoke two years ago does not and will not change the balance of strategic power. The United States has chosen, deliberately, to concentrate on more mobile and more efficient weapons, with lower but entirely sufficient yield ...' - President John F. Kennedy in his television broadcast to the American public, 26 July 1963.**

**'During World War II many large cities in England, Germany, and Japan were subjected to terrific attacks by high-explosive and incendiary bombs. Yet, when proper steps had been taken for the protection of the civilian population and for the restoration of services after the bombing, there was little, if any, evidence of panic. It is the purpose of this book to state the facts concerning the atomic bomb, and to make an objective, scientific analysis of these facts. It is hoped that as a result, although it may not be feasible completely to allay fear, it will at least be possible to avoid panic.'**

**– Dr George Gamow (the big bang cosmologist), Dr Samuel Glasstone, DSc (Executive Editor of the book), and Professor Joseph O. Hirschfelder, *The Effects of Atomic Weapons,* Chapter 1, p. 1, Paragraph 1.3, U.S. Department of Defense, September 1950.**

**'The consequences of a multiweapon nuclear attack would certainly be grave ... Nevertheless, recovery should be possible if plans exist and are carried out to restore social order and to mitigate the economic disruption.'**

**- Philip J. Dolan, editor of *Nuclear Weapons Employment* FM 101-31 (1963), *Capabilities of Nuclear Weapons* DNA-EM-1 (1972), and *The Effects of Nuclear Weapons* (1977), Stanford Research Institute, Appendix A of the U.S. National Council on Radiological protection (NCRP) symposium *The Control of Exposure to the Public of Ionising Radiation in the Event of Accident or Attack,* 1981.**

**'Suppose the bomb dropped on Hiroshima had been 1,000 times as powerful ... It could not have killed 1,000 times as many people, but at most the entire population of Hiroshima ... [regarding the hype about various nuclear "overkill" exaggerations] there is enough water in the oceans to drown everyone ten times.'**

**- Professor Brian Martin, PhD (physics), 'The global health effects of nuclear war', *Current Affairs Bulletin,* Vol. 59, No. 7, December 1982, pp. 14-26.**

**In 1996, half a century after the nuclear detonations, data on cancers from the Hiroshima and Nagasaki survivors was published by D. A. Pierce et al. of the Radiation Effects Research Foundation, RERF (*Radiation Research* vol. 146 pp. 1-27; *Science* vol. 272, pp. 632-3) for 86,572 survivors, of whom 60% had received bomb doses of over 5 mSv (or 500 millirem in old units) suffering 4,741 cancers of which only 420 were due to radiation, consisting of 85 leukemias and 335 solid cancers.**

**'Today we have a population of 2,383 [radium dial painter] cases for whom we have reliable body content measurements. . . . All 64 bone sarcoma [cancer] cases occurred in the 264 cases with more than 10 Gy [1,000 rads], while no sarcomas appeared in the 2,119 radium cases with less than 10 Gy.'**

**- Dr Robert Rowland, Director of the Center for Human Radiobiology, *Bone Sarcoma in Humans Induced by Radium: A Threshold Response?,* Proceedings of the 27th Annual Meeting, European Society for Radiation Biology, Radioprotection colloquies, Vol. 32CI (1997), pp. 331-8.**

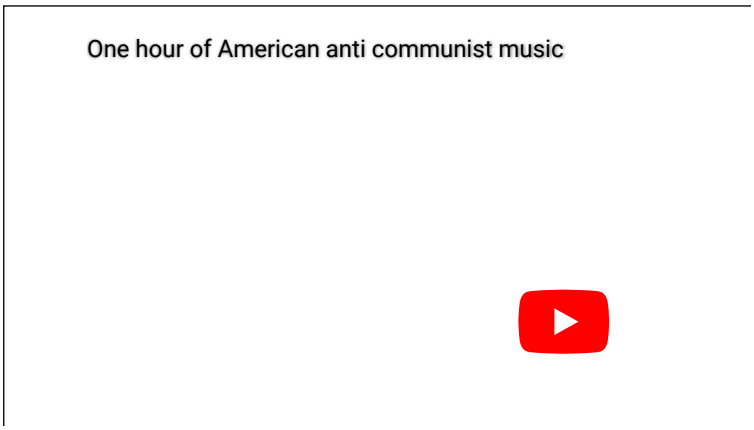
**Zbigniew Jaworowski, 'Radiation Risk and Ethics: Health Hazards, Prevention Costs, and Radiophobia', *Physics Today,* April 2000, pp. 89-90:**

**'... it is important to note that, given the effects of a few seconds of irradiation at Hiroshima and Nagasaki in 1945, a threshold near 200 mSv may be expected for leukemia and some solid tumors. [Sources: UNSCEAR, *Sources and Effects of Ionizing Radiation,* New York, 1994; W. F. Heidenreich, et al., *Radiat. Environ. Biophys.,* vol. 36 (1999), p. 205; and B. L. Cohen, *Radiat. Res.,* vol. 149 (1998), p. 525.] For a protracted lifetime natural exposure, a threshold may be set at a level of several thousand millisieverts for malignancies, of 10 grays for radium-226 in bones, and probably about 1.5-2.0 Gy for lung cancer after x-ray and gamma irradiation. [Sources: G. Jaikrishan, et al., *Radiation Research,* vol. 152 (1999), p. S149 (for natural exposure); R. D. Evans, *Health Physics,* vol. 27 (1974), p. 497 (for radium-226); H. H. Rossi and M. Zaider, *Radiat. Environ. Biophys.,* vol. 36 (1997), p. 85 (for radiogenic lung cancer).] The hormetic effects, such as a decreased cancer incidence at low doses and increased longevity, may be used as a guide for estimating practical thresholds and for setting standards. ...**

**'Though about a hundred of the million daily spontaneous DNA damages per cell remain unrepaired or misrepaired, apoptosis, differentiation, necrosis, cell cycle regulation, intercellular interactions, and the immune system remove about 99% of the altered cells. [Source: R. D. Stewart, *Radiation Research,* vol. 152 (1999), p. 101.] ...**

**'[Due to the Chernobyl nuclear accident in 1986] as of 1998 (according to UNSCEAR), a total of 1,791 thyroid cancers in children had been registered. About 93% of the youngsters have a prospect of full recovery. [Source: C. R. Moir and R. L. Telander, *Seminars in Pediatric Surgery,* vol. 3 (1994), p. 182.] ... The highest average thyroid doses in children (177 mGy) were accumulated in the Gomel region of Belarus. The highest incidence of thyroid cancer (17.9 cases per 100,000 children) occurred there in 1995, which means that the rate had increased by a factor of about 25 since 1987.**

**'This rate increase was probably a result of improved screening [not radiation!]. Even then, the incidence rate for occult thyroid cancers was still a thousand times lower than it was for occult thyroid cancers in nonexposed populations (in the US, for example, the rate is 13,000 per 100,000 persons, and in Finland it is 35,600 per 100,000 persons). Thus, given the prospect of improved diagnostics, there is an enormous potential for detecting yet more [fictitious] "excess" thyroid cancers. In a study in the US that was performed during the period of active screening in 1974-79, it was determined that the incidence rate of malignant and other thyroid nodules was greater by 21-fold than it had been in the pre-1974 period. [Source: Z. Jaworowski, *21st Century Science and Technology,* vol. 11 (1998), issue 1, p. 14.]'**




**'Professor Edward Lewis used data from four independent populations exposed to radiation to demonstrate that the incidence of leukemia was linearly related to the accumulated dose of radiation. ... Outspoken scientists, including Linus Pauling, used Lewis's risk estimate to inform the public about the danger of nuclear fallout by estimating the number of leukemia deaths that would be caused by the test detonations. In May of 1957 Lewis's analysis of the radiation-induced human leukemia data was published as a lead article in Science magazine. In June he presented it before the Joint Committee on Atomic Energy of the US Congress.' – Abstract of thesis by Jennifer Caron, *Edward Lewis and Radioactive Fallout: the Impact of Caltech Biologists Over Nuclear Weapons Testing in the 1950s and 60s,* Caltech, January 2003.**

**Dr John F. Loutit of the Medical Research Council, Harwell, England, in 1962 wrote a book called Irradiation of Mice and Men (University of Chicago Press, Chicago and London), discrediting the pseudo-science from geneticist Edward Lewis on pages 61, and 78-79:**

**'... Mole [R. H. Mole, *Brit. J. Radiol.,* v32, p497, 1959] gave different groups of mice an integrated total of 1,000 r of X-rays over a period of 4 weeks. But the dose-rate - and therefore the radiation-free time between fractions - was varied from 81 r/hour intermittently to 1.3 r/hour continuously. The incidence of leukemia varied from 40 per cent (within 15 months of the start of irradiation) in the first group to 5 per cent in the last compared with 2 per cent incidence in irradiated controls. …**

**'What Lewis did, and which I have not copied, was to include in his table another group - spontaneous incidence of leukemia (Brooklyn, N.Y.) - who are taken to have received only natural background radiation throughout life at the very low dose-rate of 0.1-0.2 rad per year: the best estimate is listed as 2 x $10^{-6}$ like the others in the table. But the value of 2 x $10^{-6}$ was not calculated from the data as for the other groups; it was merely adopted. By its adoption and multiplication with the average age in years of Brooklyners - 33.7 years and radiation dose per year of 0.1-0.2 rad - a mortality rate of 7 to 13 cases per million per year due to background radiation was deduced, or some 10-20 per cent of the observed rate of 65 cases per million per year. ...**

**'All these points are very much against the basic hypothesis of Lewis of a linear relation of dose to leukemic effect irrespective of time. Unhappily it is not possible to claim for Lewis's work as others have done, "It is now possible to calculate - within narrow limits - how many deaths from leukemia will result in any population from an increase in fall-out or other source of radiation" [Leading article in *Science,* vol. 125, p. 963, 1957]. This is just wishful journalese.**

**'The burning questions to me are not what are the numbers of leukemia to be expected from atom bombs or radiotherapy, but what is to be expected from natural background .... Furthermore, to obtain estimates of these, I believe it is wrong to go to [1950s inaccurate, dose rate effect ignoring, data from] atom bombs, where the radiations are qualitatively different [i.e., including effects from neutrons] and, more important, the dose-rate outstandingly different.'**

**Samuel Glasstone and Philip J. Dolan, *The Effects of Nuclear Weapons,* 3rd ed., 1977, pp. 611-3:**

**'From the earlier studies of radiation-induced mutations, made with fruitflies [by Nobel Laureate Hermann J. Muller and other geneticists who worked on plants, who falsely hyped their insect and plant data as valid for mammals like humans during the June 1957 U.S. Congressional**

**Hearings on fallout effects], it appeared that the number (or frequency) of mutations in a given population ... is proportional to the total dose ... More recent experiments with mice, however, have shown that these conclusions need to be revised, at least for mammals. [*Mammals are biologically closer to humans, in respect to DNA repair mechanisms, than short-lived insects whose life cycles are too small to have forced the evolutionary development of advanced DNA repair mechanisms, unlike mammals that need to survive for decades before reproducing*.] When exposed to X-rays or gamma rays, the mutation frequency in these animals has been found to be dependent on the exposure (or dose) rate ...**

**'At an exposure rate of 0.009 roentgen per minute [0.54 R/hour], the total mutation frequency in female mice is indistinguishable from the spontaneous frequency. [Emphasis added.] There thus seems to be an exposure-rate threshold below which radiation-induced mutations are absent ... with adult female mice ... a delay of at least seven weeks between exposure to a substantial dose of radiation, either neutrons or gamma rays, and conception causes the mutation frequency in the offspring to drop almost to zero. ... recovery in the female members of the population would bring about a substantial reduction in the 'load' of mutations in subsequent generations.'**

**George Bernard Shaw cynically explains groupthink brainwashing bias:**

**'We cannot help it because we are so constituted that we always believe finally what we wish to believe. The moment we want to believe something, we suddenly see all the arguments for it and become blind to the arguments against it. The moment we want to disbelieve anything we have previously believed, we suddenly discover not only that there is a mass of evidence against, but that this evidence was staring us in the face all the time.'**

**From the essay titled 'What is Science?' by Professor Richard P. Feynman, presented at the fifteenth annual meeting of the National Science Teachers Association, 1966 in New York City, and published in *The Physics Teacher,* vol. 7, issue 6, 1968, pp. 313-20:**

**'... great religions are dissipated by following form without remembering the direct content of the teaching of the great leaders. In the same way, it is possible to follow form and call it science, but that is pseudo-science. In this way, we all suffer from the kind of tyranny we have today in the many institutions that have come under the influence of pseudoscientific advisers.**

**'We have many studies in teaching, for example, in which people make observations, make lists, do statistics, and so on, but these do not thereby become established science, established knowledge. They are merely an imitative form of science analogous to the South Sea Islanders' airfields - radio towers, etc., made out of wood. The islanders expect a great airplane to arrive. They even build wooden airplanes of the same shape as they see in the foreigners' airfields around them, but strangely enough, their wood planes do not fly. The result of this pseudoscientific imitation is to produce experts, which many of you are. ... you teachers, who are really teaching children at the bottom of the heap, can maybe doubt the experts. As a matter of fact, I can also define science another way: Science is the belief in the ignorance of experts.'**

**Richard P. Feynman, 'This Unscientific Age', in *The Meaning of It All,* Penguin Books, London, 1998, pages 106-9:**

**'Now, I say if a man is absolutely honest and wants to protect the populace from the effects of radioactivity, which is what our scientific friends often say they are trying to do, then he should work on the biggest number, not on the smallest number, and he should try to point out that the [natural cosmic] radioactivity which is absorbed by living in the city of Denver is so much more serious [than the smaller doses from nuclear explosions] ... that all the people of Denver ought to move to lower altitudes.'**

**Feynman is *not* making a point about low level radiation effects, but about the politics of ignoring the massive natural background radiation dose, while provoking hysteria over much smaller measured fallout pollution radiation doses. Why is the anti-nuclear lobby so concerned about banning nuclear energy - which is not possible even in principle since most of our nuclear radiation is from the sun and from supernova debris contaminating the Earth from the explosion that created the solar system circa 4,540 million years ago - when they could cause much bigger radiation dose reductions to the population by concentrating on the bigger radiation source, natural background radiation. It is possible to shield natural background radiation by the air, e.g. by moving the population of high altitude cities to lower altitudes where there is more air between the people and outer space, or banning the use of high-altitude jet aircraft. The anti-nuclear lobby, as Feynman stated back in the 1960s, didn't crusade to reduce the bigger dose from background radiation. Instead they chose to argue against the *much smaller* doses from fallout pollution. Feynman's argument is still today falsely interpreted as a political statement, when it is actually exposing pseudo-science and countering political propaganda. It is still ignored by the media. It has been pointed out by Senator Hickenlooper on page 1060 of the May-June 1957 U.S. Congressional Hearings before the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy, *The Nature of Radioactive Fallout and Its Effects on Man:***

**'I presume all of us would earnestly hope that we never had to test atomic weapons ... but by the same token I presume that we want to save thousands of lives in this country every year and we could just abolish the manufacture of [road accident causing] automobiles ...'**

**Dihydrogen monoxide is a potentially very dangerous chemical containing hydrogen and oxygen which has caused numerous severe burns by scalding and deaths by drowning, contributes to the greenhouse effect, accelerates corrosion and rusting of many metals, and contributes to the erosion of our natural landscape: 'Dihydrogen monoxide (DHMO) is colorless, odorless, tasteless, and kills uncounted thousands of people every year. Most of these deaths are caused by accidental inhalation of DHMO, but the dangers of dihydrogen monoxide do not end there. Prolonged exposure to its solid form causes severe tissue damage. Symptoms of DHMO ingestion can include excessive sweating and urination, and possibly a**

**bloated feeling, nausea, vomiting and body electrolyte imbalance. For those who have become dependent, DHMO withdrawal means certain death.'**

**From the site for the petition against dihydrogen monoxide: 'Please sign this petition and help stop This Invisible Killer. Get the government to do something now. ... Contamination Is Reaching Epidemic Proportions! Quantities of dihydrogen monoxide have been found in almost every stream, lake, and reservoir in America today. But the pollution is global, and the contaminant has even been found in Antarctic ice. DHMO has caused millions of dollars of property damage in the Midwest, and recently California.'**

**A recent example of the pseudoscientific radiation 'education' masquerading as science that Feynman (quoted above) objected to in the 1960s was published in 2009 in an article called 'The proportion of childhood leukaemia incidence in Great Britain that may be caused by natural background ionizing radiation' in *Leukemia,* vol. 23 (2009), pp. 770–776, which falsely asserts - in contradiction to the evidence that the no-threshold model is *contrary* to Hiroshima and Nagasaki data: 'Risk models based primarily on studies of the Japanese atomic bomb survivors imply that low-level exposure to ionizing radiation, including ubiquitous natural background radiation, also raises the risk of childhood leukaemia. Using two sets of recently published leukaemia risk models and estimates of natural background radiation red-bone-marrow doses received by children, about 20% of the cases of childhood leukaemia in Great Britain are predicted to be attributable to this source.' The authors of this pseudoscience which is the opposite of the facts are R. Wakeford (Dalton Nuclear Institute, University of Manchester, Manchester, UK), G. M. Kendall (Childhood Cancer Research Group, Oxford, UK), and M. P. Little (Department of Epidemiology and Public Health, Imperial College, London, UK). It is disgusting and sinful that the facts about childhood leukemia are being lied on so blatantly for non-scientific purposes, and it is to be hoped that these leukemia investigators will either correct their errors or alternatively be banned from using scientific literature to promote false dogma for deception until they mend the error of their ways and repent their sins in this matter.**

**Protein P53, discovered only in 1979, is encoded by gene TP53, which occurs on human chromosome 17. P53 also occurs in other mammals including mice, rats and dogs. P53 is one of the proteins which continually repairs breaks in DNA, which easily breaks at body temperature: the DNA in each cell of the human body suffers at least two single strand breaks every second, and one double strand (i.e. complete double helix) DNA break occurs at least once every 2 hours (5% of radiation-induced DNA breaks are double strand breaks, while 0.007% of spontaneous DNA breaks at body temperature are double strand breaks)! Cancer occurs when several breaks in DNA happen to occur by chance at nearly the same time, giving several loose strand ends at once, which repair proteins like P53 then repair incorrectly, causing a mutation which can be proliferated somatically. This cannot occur when only one break occurs, because only two loose ends are produced, and P53 will reattach them correctly. But if low-LET ionising radiation levels are increased to a certain extent, causing more single strand breaks, P53 works faster and is able deal with faster breaks as they occur, so that multiple broken strand ends do not arise. This prevents DNA strands being repaired incorrectly, and prevents cancer - a result of mutation caused by faults in DNA - from arising. Too much radiation of course overloads the P53 repair mechanism, and then it cannot repair breaks as they occur, so multiple breaks begin to appear and loose ends of DNA are wrongly connected by P53, causing an increased cancer risk.**

**1. DNA-damaging free radicals are equivalent to a source of sparks which is always present naturally.**

**2. Cancer is equivalent the fire you get if the sparks are allowed to ignite the gasoline, i.e. if the free radicals are allowed to damage DNA without the damage being repaired.**

**3. Protein P53 is equivalent to a fire suppression system which is constantly damping out the sparks, or repairing the damaged DNA so that cancer doesn't occur.**

**In this way of thinking, the 'cause' of cancer will be down to a failure of a DNA repairing enzyme like protein P53 to repair the damage.**

**Dr Jane Orient, 'Homeland Security for Physicians', *Journal of American Physicians and Surgeons,* vol. 11, number 3, Fall 2006, pp. 75-9:**

**'In the 1960s, a group of activist physicians called Physicians for Social Responsibility (PSR) undertook to "educate the medical profession and the world about the dangers of nuclear weapons," beginning with a series of articles in the *New England Journal of Medicine*. [Note that journal was publishing information for anti-civil defense propaganda back in 1949, e.g. the article in volume 241, pp. 647-53 of New England Journal of Medicine which falsely suggests that civil defense in nuclear war would be hopeless because a single burned patient in 1947 with 40% body area burns required 42 oxygen tanks, 36 pints of plasma, 40 pints of whole blood, 104 pints of fluids, 4,300 m of gauze, 3 nurses and 2 doctors. First, only unclothed persons in direct line of sight without shadowing can get 40% body area burns from thermal radiation, second, duck and cover offers protection in a nuclear attack warning, and G. V. LeRoy had already published, two years earlier, in J.A.M.A., volume 134, 1947, pp. 1143-8, that less than 5% of burns in Hiroshima and Nagasaki were caused by building and debris fires. In medicine it is always possible to expend vast resources on patients who are fatally injured. In a mass casualty situation, doctors should not give up just because they don't have unlimited resources; as at Hiroshima and Nagasaki, they would need to do their best with what they have.] On its website, www.psr.org, the group boasts that it "led the campaign to end atmospheric nuclear testing." With this campaign, the linear no-threshold (LNT) theory of radiation carcinogenesis became entrenched. It enabled activists to calculate enormous numbers of potential casualties by taking a tiny risk and multiplying it by the population of the earth. As an enduring consequence, the perceived risks of radiation are far out of proportion to actual risks, causing tremendous damage to the American nuclear industry. ... Efforts to save lives were not only futile, but unethical: Any suggestion that nuclear war could be survivable increased its likelihood and was thus tantamount to warmongering, PSR spokesmen warned. ...**

**'For the mindset that engendered and enables this situation, which jeopardizes the existence of the United States as a nation as well as the lives of millions of its citizens, some American physicians and certain prestigious medical organizations bear a heavy responsibility.**

**'Ethical physicians should stand ready to help patients to the best of their ability, and not advocate sacrificing them in the name of a political agenda. Even very basic knowledge, especially combined with simple, inexpensive advance preparations, could save countless lives.'**

**Dr Theodore B. Taylor, *Proceedings of the Second Interdisciplinary Conference on Selected Effects of a General War,* DASIAC Special Report 95, July 1969, vol. 2, DASA-2019-2, AD0696959, page 298 (also linked here):**

**'I must just say that as far as I'm concerned I have had some doubts about whether we should have had a civil defense program in the past. I have no doubt whatsoever now, for this reason, that I've seen ways in which the deterrent forces can fail to hold things off, so that no matter what our national leaders do, criminal organizations, what have you, groups of people over which we have no control whatsoever, can threaten other groups of people.'**

**This point of Taylor is the key fact on the morality. Suppose we disarm and abandon nuclear power. That won't stop fallout from a war, terrorists, or a foreign reactor blast from coming. Civil defence knowledge is needed. Even when America has ABM, it will be vulnerable to wind carried fallout. No quantity of pacifist hot air will protect people against radiation.**

**Charles J. Hitch and Roland B. McKean of the RAND Corporation in their 1960 book *The Economics of Defense in the Nuclear Age,* Harvard University Press, Massachusetts, pp. 310-57:**

**'With each side possessing only a small striking force, a small amount of cheating would give one side dominance over the other, and the incentive to cheat and prepare a preventative attack would be strong ... With each side possessing, say, several thousand missiles, a vast amount of cheating would be necessary to give one side the ability to wipe out the other's striking capability. ... the more extensive a disarmament agreement is, the smaller the force that a violator would have to hide in order to achieve complete domination. Most obviously, "the abolition of the weapons necessary in a general or 'unlimited' war" would offer the most insuperable obstacles to an inspection plan, since the violator could gain an overwhelming advantage from the concealment of even a few weapons.'**

**Disarmament after World War I caused the following problem which led to World War II (reported by Winston S. Churchill in the London Daily Express newspaper of November 1, 1934):**

**'Germany is arming secretly, illegally and rapidly. A reign of terror exists in Germany to keep secret the feverish and terrible preparations they are making.'**

**British Prime Minister Thatcher's address to the United Nations General Assembly on disarmament on 23 June 1982, where she pointed out that in the years since the nuclear attacks on Hiroshima and Nagasaki, 10 million people had been killed by 140 non-nuclear conflicts:**

**'The fundamental risk to peace is not the existence of weapons of particular types. It is the disposition on the part of some states to impose change on others by resorting to force against other nations ... Aggressors do not start wars because an adversary has built up his own strength. They start wars because they believe they can gain more by going to war than by remaining at peace.'**

**J. D. Culshaw, the then Director of the U.K. Home Office Scientific Advisory Branch, stated in his article in the Scientific Advisory Branch journal *Fission Fragments,* September 1972 (issue No. 19), classified 'Restricted':**

**'Apart from those who don't want to know or can't be bothered, there seem to be three major schools of thought about the nature of a possible Third World War ...**

*** 'The first group think of something like World War II but a little worse ...**

*** '... the second of World War II but very much worse ...**

*** 'and the third group think in terms of a catastrophe ...**

**'When the Armageddon concept is in favour, the suggestion that such problems exist leads to "way out" research on these phenomena, and it is sufficient to mention a new catastrophic threat [e.g., 10 years later this was done by Sagan with "nuclear winter" hype, which turned out to be fake because modern concrete cities can't produce firestorms like 1940s wooden-built areas of Hamburg, Dresden and Hiroshima] to stimulate research into the possibilities of it arising. The underlying appeal of this concept is that if one could show that the execution of all out nuclear, biological or chemical warfare would precipitate the end of the world, no one but a mad man would be prepared to initiate such a war. [However, as history proves, plenty of mad men end up gaining power and leading countries into wars.]'**

**J. K. S. Clayton, then Director of the U.K. Home Office Scientific Advisory Branch, stated in his introduction, entitled *The Challenge - Why Home Defence?,* to the 1977 Home Office Scientific Advisory Branch *Training Manual for Scientific Advisers:***

**'Since 1945 we have had nine wars - in Korea, Malaysia and Vietnam, between China and India, China and Russia, India and Pakistan and between the Arabs and Israelis on three occasions. We have had confrontations between East and West over Berlin, Formosa and Cuba. There**

**have been civil wars or rebellions in no less than eleven countries and invasions or threatened invasions of another five. Whilst it is not suggested that all these incidents could have resulted in major wars, they do indicate the aptitude of mankind to resort to a forceful solution of its problems, sometimes with success. ...'**

**It is estimated that Mongol invaders exterminated 35 million Chinese between 1311-40, without modern weapons. Communist Chinese killed 26.3 million dissenters between 1949 and May 1965, according to detailed data compiled by the Russians on 7 April 1969. The Soviet communist dictatorship killed 40 million dissenters, mainly owners of small farms, between 1917-59. Conventional (non-nuclear) air raids on Japan killed 600,000 during World War II. The single incendiary air raid on Tokyo on 10 March 1945 killed 140,000 people (more than the total for nuclear bombs on Hiroshima and Nagasaki combined) at much less than the $2 billion expense of the Hiroshima and Nagasaki nuclear bombs! Non-nuclear air raids on Germany during World War II killed 593,000 civilians. The argument that the enemy will continue stocking megaton fallout weapons if we go to cleaner weapons is irrelevant for deterrence, since we're not planning to start war, just to credibly deter invasions. You should not try to lower your standards of warfare to those of your enemy to appease groupthink taboos, or you will end up like Britain's leaders in the 1930s, trying to collaborate with fascists for popular applause.**

**House of Lords debate *Nuclear Weapons: Destructive Power,* published in Hansard, 14 June 1988:**

**Lord Hailsham of Saint Marylebone: 'My Lords, if we are going into the question of lethality of weapons and seek thereby to isolate the nuclear as distinct from the so-called conventional range, is there not a danger that the public may think that Vimy, Passchendaele and Dresden were all right —sort of tea parties—and that nuclear war is something which in itself is unacceptable?'**

**Lord Trefgarne: 'My Lords, the policy of making Europe, or the rest of the world, safe for conventional war is not one that I support.'**

**House of Commons debate *Civil Defence* published in Hansard, 26 October 1983:**

**Mr. Bill Walker (Tayside, North): 'I remind the House that more people died at Stalingrad than at Hiroshima or Nagasaki. Yet people talk about fighting a conventional war in Europe as if it were acceptable. One rarely sees demonstrations by the so-called peace movement against a conventional war in Europe, but it could be nothing but ghastly and horrendous. The casualties would certainly exceed those at Stalingrad, and that cannot be acceptable to anyone who wants peace'**

**On 29 October 1982, Thatcher stated of the Berlin Wall: 'In every decade since the war the Soviet leaders have been reminded that their pitiless ideology only survives because it is maintained by force. But the day comes when the anger and frustration of the people is so great that force cannot contain it. Then the edifice cracks: the mortar crumbles ... one day, liberty will dawn on the other side of the wall.'**

**On 22 November 1990, she said: 'Today, we have a Europe ... where the threat to our security from the overwhelming conventional forces of the Warsaw Pact has been removed; where the Berlin Wall has been torn down and the Cold War is at an end. These immense changes did not come about by chance. They have been achieved by strength and resolution in defence, and by a refusal ever to be intimidated.'**

**'The case for civil defence stands regardless of whether a nuclear deterrent is necessary or not. ... Even if the U.K. were not itself at war, we would be as powerless to prevent fallout from a nuclear explosion crossing the sea as was King Canute to stop the tide.' - U.K. Home Office leaflet, Civil Defence, 1982.**

**'... peace cannot be guaranteed absolutely. Nobody can be certain, no matter what policies this or any other Government were to adopt, that the United Kingdom would never again be attacked. Also we cannot tell what form such an attack might take. Current strategic thinking suggests that if war were to break out it would start with a period of conventional hostilities of uncertain duration which might or might not escalate to nuclear conflict. ... while nuclear weapons exist there must always be a chance, however small, that they will be used against us [like gas bombs in World War II]. ... as a consequence of war between other nations in which we were not involved fall out from nuclear explosions could fall on a neutral Britain. ... conventional war is not the soft option that is sometimes suggested. It is also too easily forgotten that in World War II some 50 million people died and that conventional weapons have gone on killing people ever since 1945 without respite.' - - The Minister of State, Scottish Office (Lord Gray of Contin), House of Lords debate on Civil Defence (General Local Authority Functions) Regulations, Hansard, vol. 444, cc. 523-49, 1 November 1983.**

**'All of us are living in the light and warmth of a huge hydrogen bomb, 860,000 miles across and 93 million miles away, which is in a state of continuous explosion.' - Dr Isaac Asimov.**

**'Dr Edward Teller remarked recently that the origin of the earth was somewhat like the explosion of the atomic bomb...' – Dr Harold C. Urey, *The Planets: Their Origin and Development,* Yale University Press, New Haven, 1952, p. ix.**

**'But compared with a supernova a hydrogen bomb is the merest trifle. For a supernova is equal in violence to about a million million million million hydrogen bombs all going off at the same time.' – Sir Fred Hoyle (1915-2001), *The Nature of the Universe,* Pelican Books, London, 1963, p. 75.**

**'In fact, physicists find plenty of interesting and novel physics in the environment of a nuclear explosion. Some of the physical phenomena are valuable objects of research, and promise to provide further understanding of nature.' – Dr Harold L. Brode, The RAND Corporation, 'Review of**

**Nuclear Weapons Effects,' *Annual Review of Nuclear Science,* Volume 18, 1968, pp. 153-202.**

**'It seems that similarities do exist between the processes of formation of single particles from nuclear explosions and formation of the solar system from the debris of a [4 x $10^{28}$ megatons of TNT equivalent, type Ia] supernova explosion. We may be able to learn much more about the origin of the earth, by further investigating the process of radioactive fallout from the nuclear weapons tests.' – Dr Paul K. Kuroda (1917-2001), University of Arkansas, 'Radioactive Fallout in Astronomical Settings: Plutonium-244 in the Early Environment of the Solar System,' pages 83-96 of *Radionuclides in the Environment: A Symposium Sponsored By the Division of Nuclear Chemistry and Technology At the 155th Meeting of the American Chemical Society, San Francisco, California, April 1-3, 1968*, edited by Symposium Chairman Dr Edward C. Freiling (1922-2000) of the U.S. Naval Radiological Defense Laboratory, Advances in Chemistry Series No. 93, American Chemical Society, Washington, D.C., 1970.**

**Dr Paul K. Kuroda (1917-2001) in 1956 correctly predicted the existence of water-moderated natural nuclear reactors in flooded uranium ore seams, which were discovered in 1972 by French physicist Francis Perrin in three ore deposits at Oklo in Gabon, where sixteen sites operated as natural nuclear reactors with self-sustaining nuclear fission 2,000 million years ago, each lasting several hundred thousand years, averaging 100 kW. The radioactive waste they generated remained in situ for a period of 2,000,000,000 years without escaping. They were discovered during investigations into why the U-235 content of the uranium in the ore was only 0.7171% instead of the normal 0.7202%. Some of the ore, in the middle of the natural reactors, had a U-235 isotopic abundance of just 0.440%. Kuroda's brilliant paper is entitled, 'On the Nuclear Physical Stability of the Uranium Minerals', published in the *Journal of Chemical Physics*, vol. 25 (1956), pp. 781–782 and 1295–1296.**

**A type Ia supernova explosion, always yielding 4 x $10^{28}$ megatons of TNT equivalent, results from the critical mass effect of the collapse of a white dwarf as soon as its mass exceeds 1.4 solar masses due to matter falling in from a companion star. The degenerate electron gas in the white dwarf is then no longer able to support the pressure from the weight of gas, which collapses, thereby releasing enough gravitational potential energy as heat and pressure to cause the fusion of carbon and oxygen into heavy elements, creating massive amounts of radioactive nuclides, particularly intensely radioactive nickel-56, but half of all other nuclides (including uranium and heavier) are also produced by the 'R' (rapid) process of successive neutron captures by fusion products in supernovae explosions. Type Ia supernovae occur typically every 400 years in the Milky Way galaxy. On 4 July 1054, Chinese astronomers observed in the sky (without optical instruments) the bright supernova in the constellation Taurus which today is still visible as the Crab Nebula through telescopes. The Crab Nebula debris has a diameter now of 7 light years and is still expanding at 800 miles/second. The supernova debris shock wave triggers star formation when it encounters hydrogen gas in space by compressing it and seeding it with debris; bright stars are observed in the Orion Halo, the 300 light year diameter remains of a supernova. It is estimated that when the solar system was forming 4,540 million years ago, a supernova occurred around 100 light years away, and the heavy radioactive debris shock wave expanded at 1,000 miles/second. Most of the heavy elements including iron, silicon and calcium in the Earth and people are the stable end products of originally radioactive decay chains from the space burst fallout of a 7 x $10^{26}$ megatons thermonuclear explosion, created by fusion and successive neutron captures after the implosion of a white dwarf; a supernova explosion.**

**How would a $10^{55}$ megaton hydrogen bomb explosion differ from the big bang? Ignorant answers biased in favour of curved spacetime (ignoring quantum gravity!) abound, such as claims that explosions can't take place in 'outer space' (disagreeing with the facts from nuclear space bursts by Russia and America in 1962, not to mention natural supernova explosions in space!) and that explosions produce sound waves in air by definition! There are indeed major differences in the nuclear reactions between the big bang and a nuclear bomb. But it is helpful to notice the solid physical fact that implosion systems suggest the mechanism of gravitation: in implosion, TNT is well-known to produce an *inward* force on a bomb core, but Newton's 3rd law says there is an equal and opposite reaction force *outward*. In fact, you can't have a radially outward force without an inward reaction force! It's the rocket principle. The rocket accelerates (with force $F = ma$) *forward* by virtue of the recoil from accelerating the exhaust gas (with force $F = -ma$) in the *opposite* direction! Nothing massive accelerates without an equal and opposite reaction force. Applying this *fact* to the measured 6 x $10^{-10}$ $ms^{-2}$ ~ $Hc$ cosmological acceleration of matter radially outward from observers in the universe which was predicted accurately in 1996 and later observationally discovered in 1999 (by Perlmutter, et al.), we find an outward force $F = ma$ and inward reaction force by the 3rd law. The inward force allows quantitative predictions, and is mediated by gravitons, predicting gravitation in a checkable way (unlike string theory, which is just a landscape of $10^{500}$ different perturbative theories and so can't make any falsifiable predictions about gravity). So it seems as if nuclear explosions do indeed provide helpful analogies to natural features of the world, and the mainstream lambda-CDM model of cosmology - with its force-fitted unobserved *ad hoc* speculative 'dark energy' - ignores and sweeps under the rug major quantum gravity effects which increase the physical understanding of particle physics, particularly force unification and the relation of gravitation to the existing electroweak SU(2) x U(1) section of the Standard Model of fundamental forces.**

**Richard Lieu, Physics Department, University of Alabama, 'Lambda-CDM cosmology: how much suppression of credible evidence, and does the model really lead its competitors, using all evidence?', http://arxiv.org/abs/0705.2462.**

**Even Einstein grasped the possibility that general relativity's lambda-CDM model is at best just a classical approximation to quantum field theory, at the end of his life when he wrote to Besso in 1954:**

**'I consider it quite possible that physics cannot be based on the [classical differential equation] field principle, i.e., on continuous structures. In that case, nothing remains of my entire castle in the air, [non-quantum] gravitation theory included ...'**

**'Science is the organized skepticism in the reliability of expert opinion.' - Professor Richard P. Feynman (quoted by Professor Lee Smolin, *The Trouble with Physics,* Houghton-Mifflin, New York, 2006, p. 307).**

**'The expression of dissenting views may not seem like much of a threat to a powerful organization, yet sometimes it triggers an amazingly hostile response. The reason is that a single dissenter can puncture an illusion of unanimity. ... Among those suppressed have been the engineers who tried to point out problems with the Challenger space shuttle that caused it to blow up. More fundamentally, suppression is a denial of the open dialogue and debate that are the foundation of a free society. Even worse than the silencing of dissidents is the chilling effect such practices have on others. For every individual who speaks out, numerous others decide to play it safe and keep quiet. More serious than external censorship is the problem of self-censorship.'**

**— Professor Brian Martin, University of Wollongong, 'Stamping Out Dissent', Newsweek, 26 April 1993, pp. 49-50**

**In 1896, Sir James Mackenzie-Davidson asked Wilhelm Röntgen, who discovered X-rays in 1895: 'What did you think?' Röntgen replied: 'I did not think, I investigated.' The reason? Cathode ray expert J. J. Thomson in 1894 saw glass fluorescence far from a tube, but due to prejudice (expert opinion) he avoided investigating that X-ray evidence! 'Science is the organized skepticism in the reliability of expert opinion.' - Richard Feynman, in Lee Smolin, *The Trouble with Physics,* Houghton-Mifflin, 2006, p. 307.**

**Mathematical symbols in this blog: your computer's browser needs access to standard character symbol sets to display Greek symbols for mathematical physics. If you don't have the symbol character sets installed, the density symbol 'ρ' (*Rho*) will appear as 'r' and the 'π' (*Pi*) symbol will as 'p', causing confusion with the use of 'r' for radius and 'p' for momentum in formulae. This problem exists with Mozilla Firefox 3, but not with Microsoft Explorer which displays Greek symbols.**

**About Me**

**Name: nige**

**Currently designing secure active server page (ASP) front ends for client SQL databases. In 1982 I began programming in basic, and at college learned Fortran while a physics undergraduate a decade later. Afterwards, I switched from mainstream physics and mathematical education to part-time programming student, while working in a series of jobs including four years in credit control. www.quantumfieldtheory.org http://glasstone.blogspot.co.uk/2015/07/capabilities-of-nuclear-weapons.html/ http://www.math.columbia.edu/~woit/wordpress/?p=273#comment-5322. http://www.math.columbia.edu/~woit/wordpress/?p=353&cpage=1#comment-8728. http://www.math.columbia.edu/~woit/wordpress/?p=215#comment-4082.**

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**From 1945-62, America tested 216 nuclear weapons in the atmosphere, totalling 154 megatons, with a mean yield of 713 kilotons**

**From 1949-62, Russia tested 214 nuclear weapons in the atmosphere, totalling 281 megatons, with a mean yield of 1.31 megatons**

**From 1952-8, Britain tested 21 nuclear weapons in the atmosphere, totalling 10.8 megatons, with a mean yield of 514 kilotons**

**From 1960-74, France tested 46 nuclear weapons in the atmosphere, totalling 11.4 megatons, with a mean yield of 248 kilotons**

**From 1964-80, China tested 23 nuclear weapons in the atmosphere, totalling 21.5 megatons, with a mean yield of 935 kilotons**

**In summary, from 1945-80, America, Russia, Britain, France and China tested 520 nuclear weapons in the atmosphere, totalling 478.7 megatons, with a mean yield of 921 kilotons**

**Mean yield of the 5,192 nuclear warheads and bombs in the deployed Russian nuclear stockpile as of January 2009: 0.317 Mt. Total yield: 1,646 Mt.**

**Mean yield of the 4,552 nuclear warheads and bombs in the deployed U.S. nuclear stockpile as of January 2007: 0.257 Mt. Total yield: 1,172 Mt.**

**For diffraction damage where damage areas scale as the two-thirds power of explosive yield, this stockpile's area damage potential can be compared to the 20,000,000 conventional bombs of 100 kg size (2 megatons of TNT equivalent total *energy*) dropped on Germany during World War II: (Total nuclear bomb blast diffraction damaged ground *area*)/(Total conventional blast diffraction damaged ground *area* to Germany during World War II) = $[4{,}552*(0.257\ \text{Mt})^{2/3}]/[20{,}000{,}000*(0.0000001\ \text{Mt})^{2/3}] = 1{,}840/431 = 4.3$. Thus, although the entire U.S. stockpile has a TNT *energy* equivalent to 586 times that of the 2 megatons of conventional bombs dropped on Germany in World War II, it is only capable of causing 4.3 times as much diffraction type damage area, because *any given amount of explosive energy is far more efficient when distributed over many small explosions than in a single large explosion! Large explosions are inefficient because they cause unintended collateral damage, wasting energy off the target area and injuring or damaging unintended targets!***

**In a controlled sample of 36,500 survivors, 89 people got leukemia over a 40 year period, above the number in the unexposed control group. (Data: *Radiation Research,* volume 146, 1996, pages 1-27.) Over 40 years, in 36,500 survivors monitored, there were 176 leukemia deaths which is 89 more than the control (unexposed) group got naturally. There were 4,687 other cancer deaths, but that was merely 339 above the number in the control (unexposed) group, so this is statistically a much smaller rise than the leukemia result. Natural leukemia rates, which are very low in any case,**

**were increased by 51% in the irradiated survivors, but other cancers were merely increased by just 7%. Adding all the cancers together, the total was 4,863 cancers (virtually all natural cancer, nothing whatsoever to do with radiation), which is just 428 more than the unexposed control group. Hence, the total increase over the natural cancer rate due to bomb exposure was only 9%, spread over a period of 40 years. There was no increase whatsoever in genetic malformations.**

**There should be a note here about how unnatural radioactive pollution is (not) in space: the earth's atmosphere is a radiation shield equivalent to being protected behind a layer of water 10 metres thick. This reduces the cosmic background radiation by a factor of 100 of what it would be without the earth's atmosphere. Away from the largely uninhabited poles, the Earth's magnetic field also protects us against charged cosmic radiations, which are deflected and end up spiralling around the magnetic field at high altitude, in the Van Allen trapped radiation belts.** ***On the Moon, for example, there is no atmosphere or significant magnetic field so the natural background radiation exposure rate at solar minimum is 1 milliRoentgen per hour (about 10 microSieverts/hour) some 100 times that on the Earth (0.010 milliRoentgen per hour or about 0.10 microSieverts/hour). The Apollo astronauts visiting the Moon wore dosimeters and they received an average of 275 milliRoentgens (about 2.75 milliSieverts) of radiation (well over a year's exposure to natural background at sea level) in over just 19.5 days.*** **It is a lot more than that during a solar flare, which is one of the concerns for astronauts to avoid (micrometeorites are another concern in a soft spacesuit).**

**The higher up you are above sea level, the less of the atmosphere there is between you and space, so the less shielding you have to protect you from the intense cosmic space radiations (emitted by thermonuclear reactors we call 'stars', as well as distant supernovae explosions). At sea level, the air above you constitutes a radiation shield of 10 tons per square metre or the equivalent of having a 10 metres thick water shield between you and outer space. As you go up a mountain or up in an aircraft, the amount of atmosphere between you and space decreases, thus radiation levels increase with altitude because there is less shielding.** ***The normal background radiation exposure rate shoots up by a factor of 20, from 0.010 to 0.20 milliRoentgens per hour, when any airplane ascends from sea level to 36,000 feet cruising altitude.*** **(The now obsolete British Concorde supersonic transport used to maintain radiation-monitoring equipment so that it could drop to lower-altitude flight routes if excessive cosmic radiation due to solar storms were detected.) Flight aircrew get more radiation exposure than many nuclear industry workers at nuclear power plants. Residents of the high altitude city of Denver get 100 milliRoentgens (about 1 milliSievert) more annual exposure than a resident of Washington, D.C., but the mainstream anti-radiation cranks don't campaign for the city to be shut to save kids radiation exposure, for mountain climbing to be banned, etc.!**

**1994 revised Introduction to Kearny's Nuclear War Survival Skills, by Dr Edward Teller, January 14, 1994:**

**'If defense is neglected these weapons of attack become effective. They become available and desirable in the eyes of an imperialist dictator, even if his means are limited. Weapons of mass destruction could become equalizers between nations big and small, highly developed and primitive, if defense is neglected. If defense is developed and if it is made available for general prevention of war, weapons of aggression will become less desirable. Thus defense makes war itself less probable. ... One psychological defense mechanism against danger is to forget about it. This attitude is as common as it is disastrous. It may turn a limited danger into a fatal difficulty.'**

**Advice of Robert Watson-Watt (Chief Scientist on the World War II British Radar Project, defending Britain against enemy attacks): 'Give them the third best to go on with, the second best comes too late, the best never comes.'**

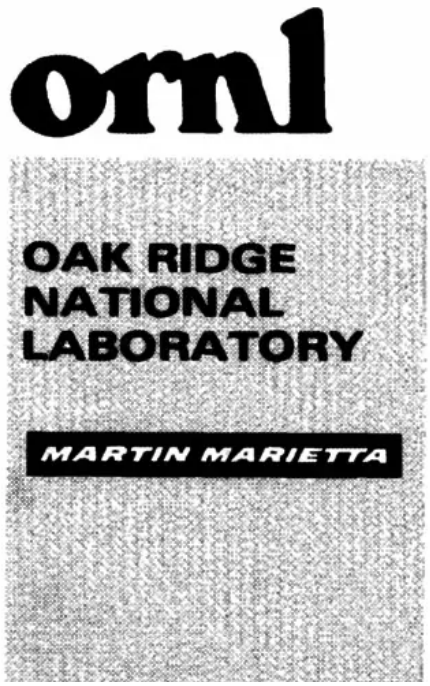
**From Wikipedia (a source of groupthink): 'Groupthink is a type of thought exhibited by group members who try to minimize conflict and reach consensus without critically testing, analyzing, and evaluating ideas. Individual creativity, uniqueness, and independent thinking are lost in the pursuit of group cohesiveness, as are the advantages of reasonable balance in choice and thought that might normally be obtained by making decisions as a group. During groupthink, members of the group avoid promoting viewpoints outside the comfort zone of consensus thinking. A variety of motives for this may exist such as a desire to avoid being seen as foolish, or a desire to avoid embarrassing or angering other members of the group. Groupthink may cause groups to make hasty, irrational decisions, where individual doubts are set aside, for fear of upsetting the group's balance.'**

**Links**

- **Google News**
- **Dr Carl E. Baum's EMP theory and interaction notes**
- **The Atomic Heritage Foundation**
- **Radiation Effects Research Foundation lumps data together to cover up benefits of low dose radiation in Hiroshima and Nagasaki Life Span Study!**
- **DTRA (Defense Threat Reduction Agency) Nuclear testing histories (PDF files)**
- **Samuel Glasstone and Philip J. Dolan**
- **Carl F. Miller's fallout research at nuclear tests**
- **British Home Office Scientific Advisory Branch**
- **Samuel Cohen's book about the collateral damage averting, invasion-deterring neutron bomb he invented, and the lying political attacks he endured as a result**
- **Jerry Emanuelson's review of EMP facts, including the direct dependence of the EMP on the Earth's natural magnetic field strength at the burst location**
- **Essays by 1950s American nuclear weapon effects test (and neutron bomb design) experts, discrediting anti-civil defence propaganda**

- **Neutron bomb inventor Samuel Cohen's 2006 book on the history of the neutron bomb, the most moral weapon ever invented due to its purely military deterrent capabilities, and the pesudo-scientific propaganda war he has had to endure from the enemies of deterrence**
- **Karl-Ludvig Grønhaug's EMP reports page with useful PDF downloads on prompt EMP and MHD-EMP measurements from nuclear tests (Norwegian language)**
- **Colonel Derek L. Duke's factual book on nuclear weapons accidents, *Chasing Loose Nukes, as told to Fred Dungan***
- **The H-Bomb and the birth of the Universe: 'For 100 Million years after time began, the universe was dark as pitch. The clouds of hydrogen condensed into huge nuclear fireballs. That moment-when the universe first lit up-was the moment of creation that matters...'**
- **American *EMP Interaction* manual: comprehensive theory of both the EMP source mechanism and the EMP pick-up in cables and antenna by electromagnetic inductance (30 MB PDF file)**
- **British Mission to Japan, *The Effects of the Atomic Bombs at Hiroshima and Nagasaki*, H. M. Stationery Office, London, 1946 (high quality 42.5 MB pdf file).**
- **1950 edition (high quality 82.7 MB PDF file) of U.S. Department of Defense book *The Effects of Atomic Weapons***
- **1957 edition (high quality 90.8 MB PDF file) of subsequently deleted sections on nuclear tests of civil defense countermeasures from U.S. Department of Defense book *The Effects of Nuclear Weapons***
- **1957 edition (low quality 30.6 MB PDF file) of entire U.S. Department of Defense book *The Effects of Nuclear Weapons***
- **1962/64 edition (high quality 188 MB PDF file) of major revised sections in the U.S. Department of Defense book *The Effects of Nuclear Weapons***
- **1962/64 edition (high quality 43.8 MB PDF file) of 74 pages of subsequently deleted material dealing with thermal ignition of houses at nuclear tests and civil defense countermeasures chapter, from the U.S. Department of Defense book *The Effects of Nuclear Weapons***
- **1977 edition (single 36.8 MB PDF file) of U.S. Department of Defense book *The Effects of Nuclear Weapons***
- **Bill Forstchen, "One Second After" book about EMP attack risk and its effects on USA.**
- **U.S. Department of Energy Opennet Documents Online (includes many Nevada and Pacific nuclear test reports as PDF files)**
- **Defense Technical Information Center (DTIC)'s Scientific and Technical Information Network (STINET) Service (other declassified Nevada and Pacific test reports)**
- **Highlights from ABM testing history**
- **THAAD Goes Another ABM Test**
- **Alex Wellerstein's Restricted Data blog contains some interesting news (but beware of his uncritical use of unobstructed dry desert and nude skin thermal radiation and other effects predictions from the 1977 edition of Glasstone and Dolan; he deletes critically objective comments and pretends that honest criticisms of propaganda as being ignorant deception are rude as an excuse for ignoring the facts and refusing to engage in objective discussion of controversial aspects of this topic; basically if you pay homage and engage in groupthink bias you may be tolerated).**
- **Carey Sublette's Nuclear Weapon Archive (it contains errors from Chuck Hansen's compilation, and it is concentrated on bomb building, not on civil defence countermeasure evaluations done at nuclear tests; note that Chuck Hansen's books and CDs give a false quotation from Neil O' Hines's book *Proving Ground*son the effects of the 1952 Mike explosion on nearby Engebi Island, where Hines later in the book states that the native rats in fact *survived the intense close-in blast, heat and fallout under a few unches of soil, despite the initial ignorant belief that they could not have survived!!!*)**

- **Quantum Field Theory**
- **Los Alamos Science journal**
- **Excellent particle physics gauge theory (fundamental force interaction) issue of Los Alamos Science journal**

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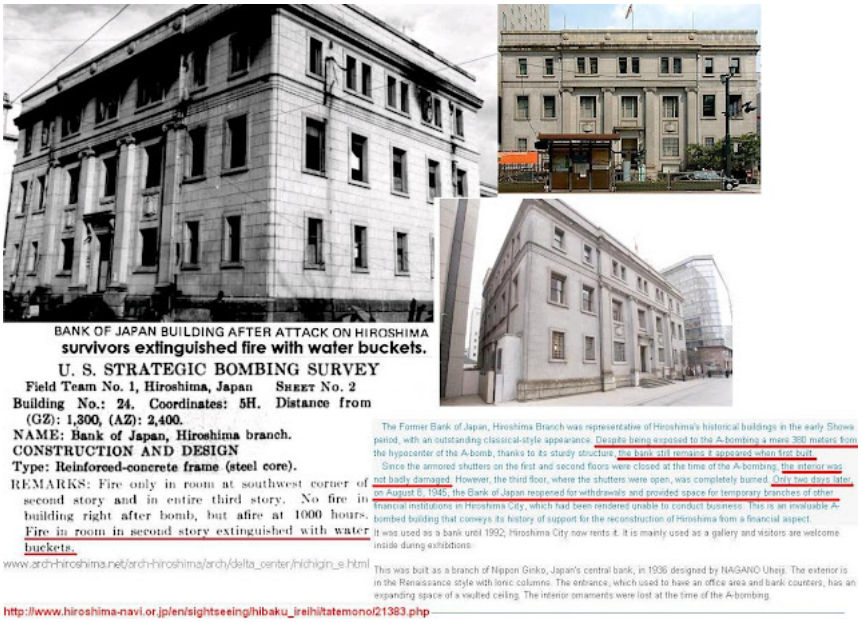
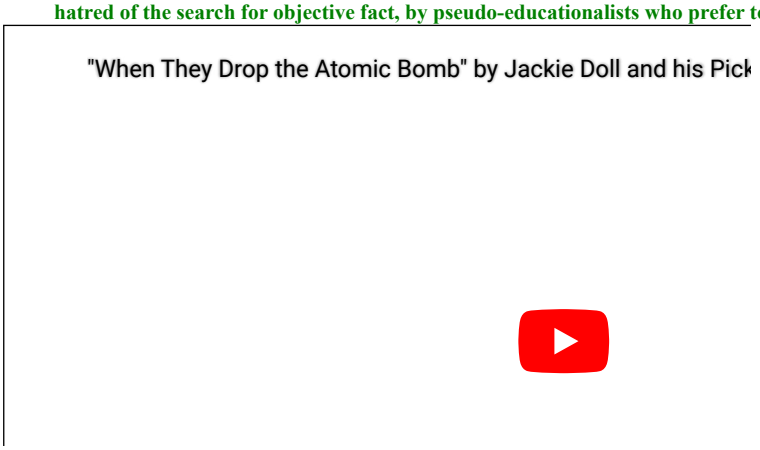



**The Bank of Japan, Hiroshima, survived 380 m from Ground Zero, within the firestorm area, when fires were extinguished by water buckets by its survivors, the majority of people in the building having survived. Secret US Strategic Bombing Survey report proves civil defense for modern concrete buildings is effective. The building was reopened as a bank on 8 August, merely two days after nuclear attack, and continued in use as a bank until 1992. It remains in Hiroshima. This beautifully designed and sturdy reinforced concrete building was designed in 1936 by Nagano Uheiji. We need to ensure that the worst mistakes of the past are never repeated, if we are just, moral and caring towards our fellow human beings who do not deserve to be fed lies and dangerously complacent one-sided, biased propaganda based on a populist love of obsolete dogma, and/or a hatred of the search for objective fact, by pseudo-educationalists who prefer to live in utopia than in the real world of their fellow folk!"**




ACKNOWLEDGEMENTS: **(1). Thank you to http://www.militarystory.org/nuclear-detonations-in-urban-and-suburban-areas/ for re-blogging a typical post from this glasstone.blogspot.com blog, kicking out the lies from under secrecy obsessed loons who want disarmament to start WWIII.**

(2). Thank you to **https://www.nextbigfuture.com/2016/02/are-nuclear-weapons-100-times-less.html for reblogging: "Are [strategic, not tactical] Nuclear Weapons 100 times Less Effective Than Supposed? Nigel B. Cook's Glasstone.Blogspot Blog has beautiful coverage of many nuclear topics here. http://glasstone.blogspot.co.uk/ Cook is a master researcher who digs up incredible piles of research on all topics nuclear and the following is digest of various writings of his gathered for easy access centered on the remarkable thesis that the effects of nuclear weapons, while literally awesome, have been exaggerated or misunderstood to an even greater extent, with perhaps very considerable military consequences."**

TIPS: There is compendium debunking commonplace anti-nuclear CND disarmament propaganda, exaggerations and fake news on nuclear weapons effects and deterrent capabilities **linked here**. Also, each post on this blog can be viewed in either a simple format, e.g. for this current post, **https://glasstone.blogspot.com/2022/02/analogy-of-1938-munich-crisis-and.html** is the simple (faster loading) format, or you can view it (slower loading) in a fancy format by adding: **?m=1** to the end of the URL, e.g. **https://glasstone.blogspot.com/2022/02/analogy-of-1938-munich-crisis-and.html?m=1**

"The Budapest **Memorandum on Security Assurances ... at the OSCE conference in Budapest, Hungary on 5 December 1994 ... signed by three nuclear powers: the Russian Federation, the United Kingdom and the United States ... prohibited the Russian Federation, the United Kingdom and the United States from threatening or using military force or economic coercion against Ukraine, Belarus, and Kazakhstan. As a result of other agreements and the memorandum, between 1993 and 1996, Belarus, Kazakhstan and Ukraine gave up their nuclear weapons**." - Wiki.

**NATO needs to come to its senses and rearm to deter WWIII instead of stupidly leaving Putin with more nuclear weapons than anyone else, to intimidate like Hitler (see 1930s newspapers below, which spell out the problem plainly). The problem is, the media is dominated by nuclear liars just as it was dominated by gas war liars in the 1930s, who encouraged war while pretending to be doing the opposite. Fighting a conventional war using Ukraine as proxy, while having an inferior nuclear stockpile, is hardly credible nuclear deterrence (please click here for our brief declassified data debunking Glasstone's lying data on nuclear weapons effects)** . Also see the compendium **linked here for more detail on the actual declassified**

**effects found in Hiroshima, contrary to Glasstone's very deceptive treatment. "Disarmament and arms control" charlatans, quacks, cranks, liars, mass murdering Russian affiliates, and evil genocidal Marxist media exposed for what it is, what it was in the 1930s when it enabled Hitler to murder tens of millions in war**!

http://glasstone.blogspot.com/2006_03_28_archive.html http://glasstone.blogspot.com/2006_03_29_archive.html
http://glasstone.blogspot.com/2006_03_30_archive.html http://glasstone.blogspot.com/2006_03_31_archive.html
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