

THIS ISSUE

Pugwash:
Science and World Affairs

The first 10 years
of conferences calling
for an end to Wars

And sustainable development goal (SDG 2.5)

ENDING HUNGER AND MALNUTRITION

by Professor Graham Duffield, School of Law, University of Leeds

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FRONT COVER PHOTOGRAPH OF THE A-BOMB EXPLOSION OVER NAGASAKI FROM THE LOS ALAMOS NATIONAL LABORATORY IMAGE COLLECTION.

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The Past is Another Country

Editorial One: Humanities' choice

Running through Martin Gilbert's* account of the final months of World War II is a theme of flagrant disregard for the Geneva Convention. Acts more grotesque than anything Dante contemplated in his vision of hell abound. Behaviour no non-human animal would undertake erupts in every corner of the globe. What Gilbert describes is, arguably, a worse consequence for living adult humans than are the consequences of Hiroshima and Nagasaki.

Not all acts Gilbert reports could have been known until sometime after the war. Others, and earlier actions, would have been known to the planners and makers of the atomic bomb. Then the A-bomb was called dirty. H-bombs, developed after the war and never yet exploded in anger, were "clean". Many participants in the A-bomb development and deployment would have had first-hand living memories of World War I and chemical war. Along with biological and chemical warfare, nuclear weapons soon became known as weapons of mass destruction, and the focus of the Pugwash Conferences on Science and World Affairs (see feature starting on page 5).

The atomic bomb in sufficient quantity offered humanity the choice of self-annihilation. It is a weapon which became humanity's wake up call, always supposing humanity had sleep walked through two World Wars. One can see from Gilbert's reports why taking people out of the equation might tempt some. Yet people do not ask to be born. Nor are biology, physics and chemistry confined to human animals. Nor are all humans empowered. All, though, human and non-human animals and plants would be susceptible to radiation poisoning and nuclear winter.

In such a context the uncompromising view of successive Pugwash conferences that only an end to war itself will save the human race from weapons of mass destruction used in global war makes sense. Through its aims Pugwash offers the empowered, via access to knowledge and lines of communication, an alternate to science in service of war.

Editorial two: Plate tectonics and the United Nations

Even as the Atomic bomb was under development, the United Nations and its charter were being negotiated. On 26 June 1945 in San Francisco nations signed that Charter. At the time "War in Europe" was over. Hiroshima and Nagasaki were the future; their imminence known only to a small select group under terms of tightest secrecy.

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The nations had grasped the reality of World War. They knew also from experience that around the globe volcanos, earthquakes, cyclones, tsunamis and hurricanes killed hundreds of thousands. As we know now, but did not know in June 1945, plate tectonics were vying with War for top billing as the grim reaper.

In November 1945 Bertrand Russell said to the UK House of Lords, “The question is a simple one: Is it possible for a scientific society to continue to exist, or must such a scientific society bring itself to destruction?”

Beneath Russell’s feet the tectonic plates were moving, though the theory of plate tectonics was yet to emerge from the minds of geologists. Without a scientific society that global theory would not now be known, such that human beings have a fighting chance to survive what geology can throw at them. Understanding the consequences of plate tectonics still has a long way to go, but now there is a chance. What once were inexplicable “acts of god” in an insurance policy are now potentially tractable. This is the light and dark of science.

The blackness of science appears in quotes on pages 12 and 13 of the Pugwash feature. I am a journalist and an historian, and as such I have a professional duty to try to keep myself out of the story. Yet in typing up those quotes, and knowing that those who signed the statement from the first Pugwash meeting in 1957 were not exaggerating, and knowing that the yield of nuclear bombs now is so much greater, I think it would be irresponsible not to criticise President Trump for some of his rhetoric in relationship to Iran and North Korea. His country voted for him. I respect their choice, but his words may have consequences for everyone on the planet. As a human being Mr Trump in this matter has a responsibility beyond only the US. Perhaps now is the time to revive the mid-twentieth century idea of making the United Nations the single repository for nuclear weapons, and having that knowledge open to all.

St Bride and St Paul stood sentinel

There we all were
In our pearls and twin sets.
Awe struck
As the choir of St Bride's
Voices soaring
Carried John Rutter.

And we sang for the Earth,
And we sang for ourselves,
And we sang for the future,
And we sang
For the Earth we share.

Helen Gavaghan, 22nd March, 2018

Written for my former *New Scientist* colleagues on the occasion of the memorial service at St Bride's, Fleet Street on 22nd March 2018 for our friend and colleague, Steve Connor. He would have found the topics in this issue of *Science, People & Politics* interesting.

PUGWASH

Science and world affairs

A 20th century fight to save the world from nuclear Armageddon

By Helen Gavaghan



Photo # USA C-1861 The "Big Three" at Potsdam, ca. late July 1945

When Japan refused to respond as the allied powers wanted to the "Potsdam Declaration on Japan" the country sealed the fate which would unfold at Hiroshima. Key participants issuing the declaration were, from left above: Clement Attlee, British prime minister, US president Harry Truman and Soviet leader Joseph Stalin. Winston Churchill was replaced as Britain's representative because Labour won the July general election.

Credit see: <https://www.history.navy.mil/our-collections/photography/numerical-list-of-images/nara-series/USA-C/USA-C-1861.html> Accessed 17.3.2018

Go to page 10 for the start of the article.

TWO DAYS before dying Albert Einstein (1879-1955, Nobel Prize Physics in 1921) signed the Russell-Einstein Manifesto. His co-signatory, Bertrand Russell (1872-1970), was the 1950 Nobel Laureate for Literature, chosen for work which championed " ... humanitarian ideals and freedom of thought". See: https://www.nobelprize.org/nobel_prizes/literature/laureates/1950/

These two twentieth century intellectual giants write in their manifesto,

"... we feel that scientists should assemble in conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction..."

See: <https://pugwash.org/1955/07/09/statement-manifesto/> **Accessed 31.3.2018.**

The main driving force was concern about nuclear weapons. Frederic Joliot-Curie (Nobel Prize in Chemistry), Linus Pauling (Nobel Prize in Chemistry), Hideki Yukawa (Nobel Prize in Physics) and Herman Joseph Muller (Nobel Prize in Physiology and Medicine) were among those joining their names to Albert Einstein's and Bertrand Russell's. As was Joseph Rotblat (1908 to 2005). In the mid 1950s Rotblat was a professor of physics, with a post at the Medical College of St Bartholomew's Hospital, London. Rotblat was one of the few signing who did not at the time have a Nobel Prize. His Nobel Prize - - for Peace - - was not awarded until 1995. Rotblat, a key figure in the history of Pugwash, had worked on the Manhattan project, which developed the first atom bomb (A-bomb) during World War II.

Bertrand Russell presented the Russell-Einstein manifesto at a press conference in July 1955. Two years later twenty-two scientists convened in Pugwash, Canada. Three delegates were Soviet Academicians. Seven were from the US. Representatives from China, Australia, Austria, Canada, France, Japan, Poland and the UK also attended. Their aim was to meet across the political divide of the Communist and anti-Communist worlds. Without displaying affiliation for "creed or nation" and without betraying national loyalties these scientists wanted to find a way to avoid wiping out humanity via use of nuclear weapons. Those attending that first Pugwash meeting, and later ones, were well aware how hard it is for people to connect with big concepts such as mankind and "the end of humanity", but those, they knew, were the stakes. From the beginning scientists at Pugwash meetings spoke of nuclear, chemical and biological weapons as "weapons of mass destruction". It was hard for anyone scientifically literate to interpret the likely consequences of mass use of those classes of weapons in any other way.

To the Pugwash attendees history had shown that human beings will use any weapon which exists, and so they argued that only ending war itself would save the human race from what science had made possible. They denied being naïve idealists.

From the start Pugwash conferences were concerned with radiation hazards. This issue has come before Law Courts internationally very recently, as military veterans have sought compensation for exposure to radiation during nuclear tests in the 1950s. The note at the URL below from the House of Commons Library entitled "Nuclear Test Veterans—compensation", sums up how the Courts have viewed the matter up to 2012.

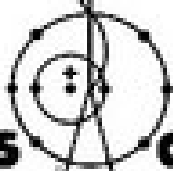
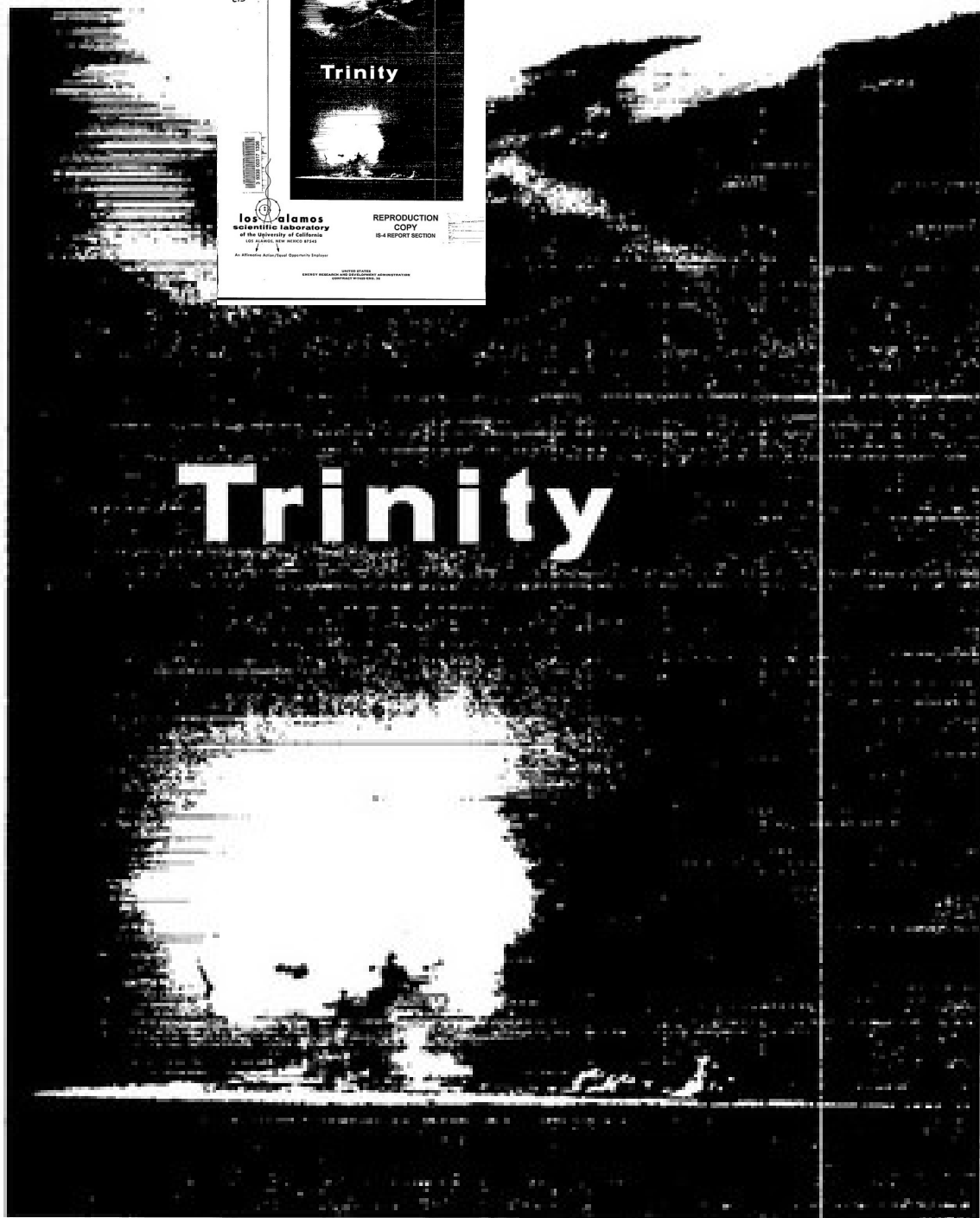
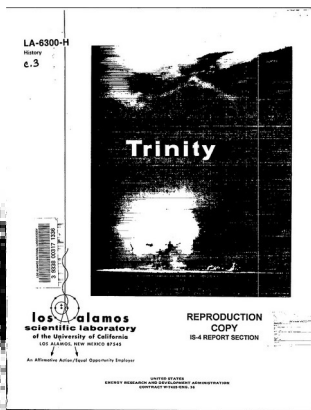
<http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN05145#fullreport>
Accessed 28-03-2018.

Continued on page 8

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History

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History images.

“In the New Mexico town of Los Alamos, the American top-secret Target Committee, which had discussed Hiroshima as a possible location for dropping of the atom bomb, heard on May 14 [1945] from the nuclear scientists on the committee that the hills around Hiroshima were ‘likely to produce a focusing effect which would considerably increase the blast damage’.”

*P 691, A History of the Twentieth Century,
Volume Two (1933 - 1951), by Martin Gilbert*

From page 6

With funding from US-Canadian industrialist, Cyrus Eaton, the first Pugwash meeting between Scientists from East and West took place in Eaton’s home town of Pugwash, Canada. It lasted from 7 to 10 July 1957. Eaton was friendly in his dealings with Russia, but he was also an arch capitalist. On his death in 1979 a report in *The New York Times* estimated Eaton was worth billions of US dollars. According to the same *New York Times* report, Eaton started life as a Republican, but ended up a Democrat.

It is interesting that the Soviet participants got visas. Those Academicians would have known that even though they would encounter fierce professional exchanges on matters of science they would not otherwise be walking into a hostile environment. It is interesting too, that even as the first Pugwash meeting was convened, Britain’s atmospheric nuclear bomb tests were underway in Maralinga, Australia. Nor were the Soviets walking into a naïve situation with colleagues oblivious to the fact that any behaviour perceived by the Soviets as other than fully sympathetic to Communism could see Soviet citizens imprisoned. Captain Alexander Solzhenitsyn, for example, had been sentenced on 5 July 1945 to eight years hard labour during a Stalinist purge. There was little room for political error if all 22 participants were to survive unscathed their trip to Pugwash. By 1957 Stalin was dead, but the political and economic divide between East and West was deep and profound.

The Soviets attending were: Professor A. M. Kuzin, Acad. D. V. Skobel'tsyn and Acad. A.V. Topchiev. Mr V. P. Pavlichenko also from the Soviet Union, together with Dr E.H.S Burhop of the UK and Mrs Ruth Adams from the US were scientific support staff.

Those organising and paying for the first Pugwash conference knew the perils Soviet bloc participants could face, but the organisers were also known to be willing to co-exist with Communism without seeking to interfere in Soviet politics, and while not showing nor holding any allegiance to Communism. Bertrand Russell was chair of the “Continuing Committee of the Pugwash Conferences on Science and World Affairs”. Russell’s views were on record with Hansard following the speech he made on 28 November, 1945 to the House of Lords (see page 10). Russell considered Russia would see that the question of the A-bomb was one of universal human interest, and that if Britain were firm about what constituted its vital interests, as well as willing to hear what Russia considered its own national interests to be, then if discussions were separated from politics and competition there might be progress in exploring how to deal with nuclear weapons. Russell did not think in 1945 that the newly constituted United Nations was strong enough to be a repository for nuclear weapons, such that no single nation would control their destructive power.

“The first Pugwash Conference (July 7 - 10 ,1957) proved that scientists have a common purpose which can transcend national frontiers without violating basic loyalties.”

P16 Pugwash, a history of the conferences on science and world affairs.

Published in 1967 by the Czechoslovak Academy of Sciences.

Equally important to the Pugwash movement was that Russell said in his 1945 speech to the UK House of Lords,

“I do not think there is any use whatever in paper prohibitions [of the A-bomb], either of the use or of the manufacture of bombs, because you cannot enforce them, and the penalty for obeying such a prohibition is greater than the penalty for infringing it, if you really are thinking of War.”

Perhaps it is with this quote that historians should begin accounts of the history of arms control, a field of endeavour which the first 10 years of Pugwash conferences did much to encourage. In this quote Russell falls just short of Arms Control concepts such as inspection and verification, and also of the concept of “Mutually assured destruction”. That doctrine - - M.A.D. - - butt of so much ridicule in the field of nuclear arms control during the second half of the twentieth century, is part of what the nuclear powers have relied on to prevent nuclear war. And the basis of M.A.D. is also what Russell unwittingly presaging in his November 1945 speech when he says,

“We must, I think, hope . . . That the Russian Government can be made to see that the utilization of this kind of warfare would mean destruction to themselves as well as to everybody else.”

It was against that back drop, with knowledge of Hiroshima and Nagasaki, knowing that the physics of destruction by atomic or hydrogen bomb is as sure as the path described by a pendulum that the Pugwash scientist set out for Canada. A mere 22 from the entire world of science. Each was personally invited, and was told their discussions would be held in private. I know that 30 years later when I attended a Pugwash meeting as a reporter for *New Scientist* shortly before the fall of the Berlin Wall that discussions were still held in private. When the consequence for an unintentionally misspoken word might be charges for treason is balanced by the consequence of Armageddon if one does not speak frankly, then the Press knows how to maintain a discrete distance.

The outcome of that first conference was a publicly issued final statement. Working papers were not released. It is explicit in the statement that the conference is a direct result of the Russell-Einstein manifesto's call for scientists to meet to consider the perils of weapons of mass destruction. Two years after that manifesto, the agreed statement of the first Pugwash meeting was able to cite concern about nuclear weapon stockpiling and new nations having joined the nuclear club, adding that there were “serious misgivings” that continued testing of such weapons may not result in damage to the population.

BOX ONE: PUGWASH PRECURSORS AND CONFERENCE FINANCE

Bertrand Russell in his guise as Earl Russell laid groundwork for Pugwash conferences in a 16-minute speech to the House of Lords on 28 November, 1945 [1]. It was Russell's second speech to the Lords. Presciently, he said fusion bombs, in which hydrogen atoms fusing with the release of tremendous destructive force, could soon be developed. Given that the temperature generated in the Atom bomb (A-bomb) was thought to be as high as in the Sun, he thought a way to harness A-bombs to make hydrogen bombs work would soon be found. After all, fusion then was known only to occur in the centre of the Sun.

To combat the horrors such weapons could release on the world Russell told the House of Lords the problem of abolishing great War had to be confronted. In his mind's eye he could see the British Museum and St Paul's Cathedral reduced to rubble with "corpses all around them.

The men of science—a turn of phrase, said Earl Russell, citing Professor Marcus Oliphant (1901 to 2000), wanted the secret of the A-bomb in the public domain. Russell did not quite agree with that view. He thought there was a short time before the Russians worked out the science of A-bombs for themselves during which time co-operative sharing could be negotiated with benefits for both sides. He was right that Russia would soon develop A bombs for themselves (See chronology on page 16, and see editorial pages 3 and 4).

Scientists were troubled by the bomb, said Russell, and he proposed that scientist might be able to meet and create conduits of communication to alleviate the damage of the bomb's existence.

Russell accepted abolishing War would be difficult, and he raised the issue of distrust between Russians and much of the rest of the world. He thought it a bad thing for Russia to have a sense of itself as being up against the whole of the rest of the world. Expecting majority decisions to be accepted by a group with that conception of itself was, in Russell's view, unrealistic.

It was another 10 years, and after being awarded a Nobel Prize for Literature, before Earl Russell wrote the manifesto viewed as the foundation of the Pugwash movement. Others thought similarly to Russell, including Jawaharlal Nehru (1889 to 1964), India's first prime minister; billionaire industrialist and arch capitalist Cyrus Eaton (1893 to 1979), who bank-rolled early Pugwash conferences [2]; The Federation of American Scientists, the Atomic Scientists Association of Great Britain and the Bulletin of American Scientists. **HG**

[1] Speech in the House of Lords by Bertrand Russell on 28 November, 1945 (4.08 pm).
<http://hansard.millbanksystems.com/lords/1945/nov/28/the-international-situation> Accessed 26.3.2018.
Read on Librivox.
https://www.youtube.com/watch?v=cpoX2oZ_ppE **and** <https://www.youtube.com/watch?v=um-l30XzZas>
 Accessed 26.3.2018

[2] Cyrus Eaton (1893 to 1979)
<https://www.nytimes.com/1979/05/11/archives/cyrus-eaton-industrialist-95-dies-cyrus-eaton-dies-at-95-cleveland.html> Accessed 27.3.2018.

BOX TWO: USS INDIANAPOLIS: LOST IN 1945 AFTER DELIVERING A-BOMB PARTS

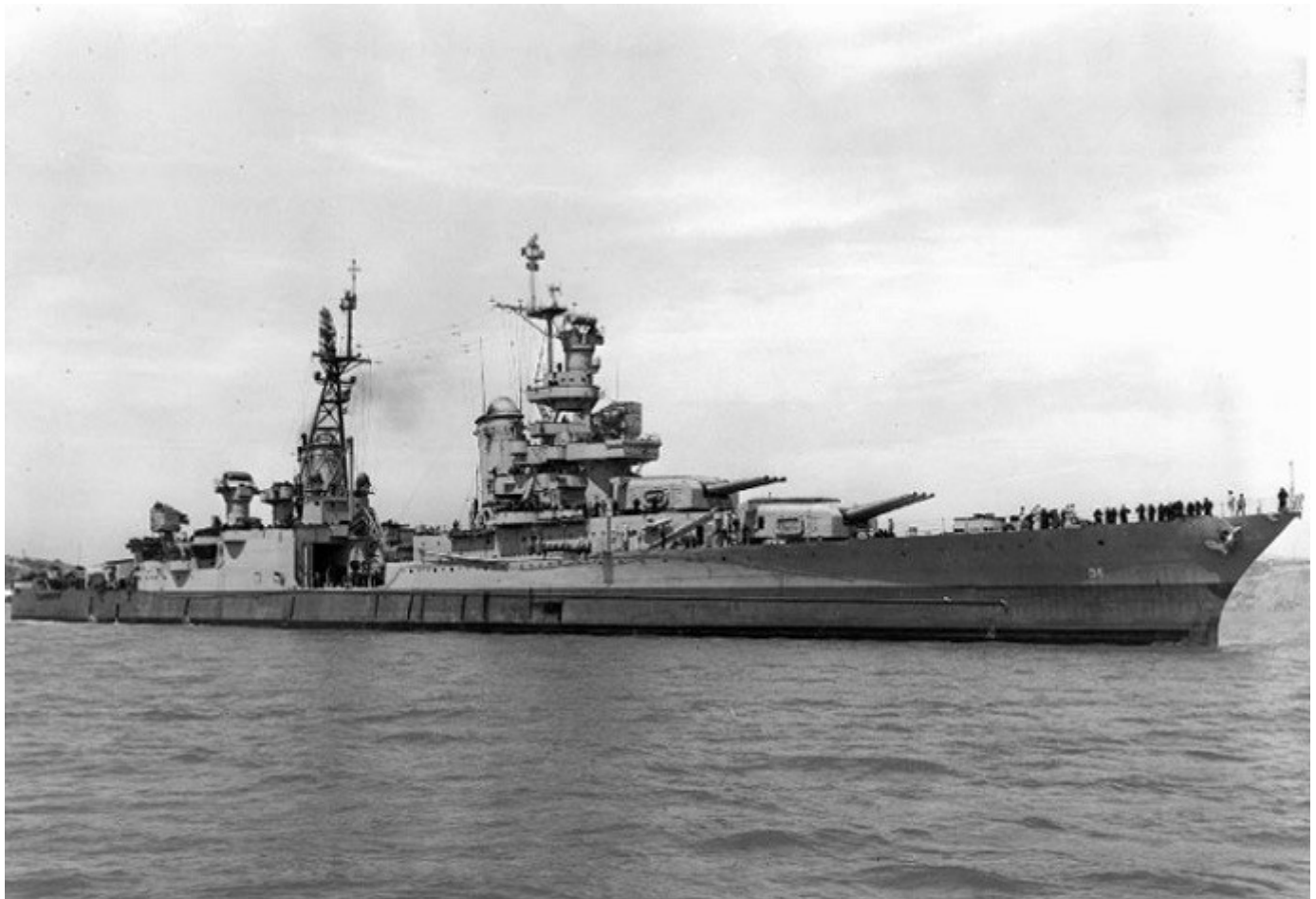


Photo # 19-N-86911 USS Indianapolis off Mare Island, 10 July 1945

“On the day the Potsdam Declaration on Japan was made public the American cruiser *Indianapolis* arrived at Tinian Island carrying the atom bomb, ready to be transferred to an aircraft. . .

“. . . The *Indianapolis*, having landed its atom bomb on Tinian, set sail for a new assignment. She was torpedoed, and blew up before she could send a distress signal. More than 350 of her crew of 1,169 were killed in the explosion. A further 484 died in the water as they struggled to keep afloat on the wreckage of the ship, were eaten by sharks, or succumbed to heat and thirst. The American naval command had no idea the *Indianapolis* had been hit. When help arrived only 318 sailors were still alive.”

A History of the Twentieth Century by Martin Gilbert, p699. Volume II (1933-1951)

The perspective of the US Naval Historical Centre in Washington DC is accessible from the urls below, accessed 19.3.2018.

<https://www.ibiblio.org/hyperwar/OnlineLibrary/photos/images/n80000/n86911.jpg>

And

<https://www.ibiblio.org/hyperwar/OnlineLibrary/photos/sh-usn/usnsh-i/ca35.htm>

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The scientists' report they had been able to discuss dispassionately many highly controversial issues, and that the international problems arising from the development of atomic energy are technical and political.

“A gathering of men of science can discuss with special competence only the scientific and technical consequences of atomic energy. Such discussions . . . can be fruitful only if it takes into account the political problems which are the background to international negotiations.” Page 80, Rotblat (1967).

In line with the Russell-Einstein manifesto the first Pugwash gathering affirmed in their closing statement they would say nothing “to favour” either the Soviet Union or the United States, which they called “the two great groups of powers” into which the world is divided. The scientists sought to avoid emphasis of technical considerations which might annoy one of the power bases, and so exacerbate international tension.

In the closing statement the group acknowledge scientists hold as diverse a set of political opinions as do any group. Combining that reality with the need not to spark an international incident meant that reaching any agreed statement on the controversial issues before them had been difficult. What had emerged was a clarification of areas of agreement and points of difference, as well as some mutual understanding of the opinions of the other. The meeting had started informally on the 6th, and Professor Leo Szilard and others with first hand knowledge of the development of the bomb shared what Rotblat calls in his history “recollections” of “immense” value as background to the discussions.

The topics explored from 7 to 9 July 1957 were; hazards arising from use of atomic energy in peace and war; problems of nuclear weapon control; and the social responsibility of scientists.

The subcommittee on nuclear hazards made an assessment of the effects of nuclear tests already carried out. Such an assessment would have been difficult because the scientists in Pugwash could not have been sure that they knew of all such tests. Essentially, this committee advocated a watching brief, especially if the number of tests was likely to increase. We now know there were very many more such test. We know this from plausibly accurate press reports, from other contemporaneous reports, from Court documents as recent as post 2010, and from ongoing declassifications of records such as that in 2014 referred to in the chronology on page 16 of this article. The radiation hazard subcommittee went on to say,

“... estimates of hazards which have arisen from test explosions permitted a closer examination ... of the probable consequences of unrestricted nuclear war . . . when the radiological hazards would be thousands of times greater. In the combatant countries hundreds of millions would be killed outright by the blast and the heat, and by ionising radiation produced at the instant of explosion ...” Rotblat (1967) Page 83.

All quotes from the statement following the First Pugwash meeting are taken from History of the Pugwash Conferences by Joseph Rotblat. The statement appears pp 42-44 in the paperback version published by Dawsons of Pall Mall, London in 1962 and on pp 80-82 of the cloth version published in 1967 by the Czechoslovak Academy of Science.

“I am become death the destroyer of worlds.”

J. Robert Oppenheimer quoting from the Hindu scripture

<https://www.youtube.com/watch?v=lb13ynu3lac>

Accessed 17.3.2018

Given those consequences, subcommittee two which explored problems of control of nuclear weapons wrote,

“The principal objective of all nations must be the abolition of war and the threat of war hanging over mankind. War must be finally eliminated, not merely regulated by limiting which weapons may be used.” Rotblat (1967), page 84.

At first glance the statement looks glib, yet from these Pugwash meetings some argue, with cause if one looks at the roll call of participants, emerged arms control, regimes of weapons inspection and international legal instruments to curb weapons of mass destruction. Be that as it may, subcommittee two of this first Pugwash meeting recognised concepts such as control systems and developing mutual confidence. Confidence building measure, inspections of various agreed kinds, from unannounced spot inspections, to planned inspections, and agreed verification measure not trespassing on commercial competitive toes are the checks put in place for arms control agreements.

The delegates recognise in their statement that where there are great strategic issues at stake, which I imagine in 1957 centred around energy security, then advocates of arms control measures have to be wary of seeming to give strategic advantage to one side or another. Yet the needs of nuclear weapons and nuclear energy are so very different.

Committee three on the responsibility of scientist agreed all possible should be done to establish a universal peace; to enlighten the public about the “great dilemmas of our time”; and to serve in the formation of national policies.

Subcommittee one produced a report on radiation hazards. They found good agreement among results of calculations from independent tests by the USSR, US, Britain and Japan on the amount of fallout from nuclear tests and its effects. A principal effect, they write, is due to Strontium-90.

“If, as some evidence indicates, the production of leukaemia and bone cancer by radiation is proportional to the dose, even down to very small doses, then we estimate the tests conducted over the past 6 years will be responsible for an increase of about two percent over the natural incidence of leukaemia and bone cancer over the next few decades. Over the next 30 years, this increase would amount to about a hundred thousand additional cases of leukaemia and bone cancer. ... These additional cases could not be identified among the 10 million or so normal cases of the same diseases.”

Rotblat (1967), A history of the conferences of science and world affairs. PP 82-83.

Photograph by Helen Gavaghan©

Published in 1967. At the time Professor Joseph Rotblat was secretary-general of the Pugwash continuing committee.



Continued from page 13

The report adds that the true number could be many times larger or smaller, and the sub-committee on nuclear hazards estimated the genetic defects from global fallout from the tests conducted in the first 6 years to mid 1957 would be similar to the amount of people succumbing to leukaemia or bone cancer as a result of strontium-90. However, they write,

“... the genetic effects from a given amount of strontium-90 will be scattered over many generations.”

The radiational hazard subcommittee report cautions that fallout affects citizens globally, and from countries whose political rulers have not consented to nor participated in nuclear testing. Of the 22 participants at this first Pugwash meeting all but Professor J.S. Foster from Canada and Professor Leo Szilard from the US signed the statement. Foster and Szilard abstained.

Not all scientists, nor indeed all scientists approached to attend the first conference, thought what the Pugwash movement was a good idea. The organisers sent out 64 letters of invitation according to the principles of seeking diverse geographic representation from qualified scientists from different political backgrounds. 30 accepted, and of those 8 were later unable to attend. Most refusals were because of previous commitments. A few suspected ulterior motives.

“Only a small minority expressed open opposition to the idea of such a conference, and claimed it was not the business of scientists to meddle in such matters.”

*Joseph Rotblat (1962) P9, History of the Pugwash Conferences.
Dawsons of Pall Mall, London (paperback).*

Strontium-90 is, of course, a fission product released when an A-bomb is detonated. Scientific discourse of the time referred to A-bombs as “dirty”. By contrast H-bombs were termed “clean”. The devastation clean bombs can wreak far exceeds that resulting from dirty bombs like those which laid waste to Hiroshima and Nagasaki. Britain, writes historian Martin Gilbert, held three atmospheric H-bomb tests in the Pacific in May and June, 1957.

At the end of the first Pugwash meeting the organisers did what all those of serious campaigning intent do; they formed a continuing committee. It was chaired by Bertrand Russell, and had four members: Cecil Powell; Eugene Rabinowich; Joseph Rotblat; and Dmitri Skobeltsyn. All four were physicists. Their first meeting was at St Bartholomew’s Hospital Medical College in London in December of that year.

In 1957 the geopolitical situations was tense. In January the UN General Assembly had established a special committee to inquire into the suppression of the Hungarian Revolution, and the committee was denied entry to Hungary. Similarly South Africa ignored the UNGA’s request that it reconsider its South-African Apartheid policy. On 10 October, 1957 the UNGA began a discussion of nuclear disarmament. On 28 November, according to historian Martin Gilbert, Nehru, the Indian prime-minister appealed to the US and USSR to suspend their atomic testing. Further, as Rotblat writes (1967, page 18), the increased international tension following breakdown earlier in the year of UN disarmament talks held in London between March and August of 1957 had added urgency to the implementation of the Pugwash aims (See a selection of research links under “background reading” on page 17.

By then Henry Kissinger had published his book, “Nuclear Weapons and Foreign Policy”. The doctrine of a limited nuclear war, in contrast to the Russell and Pugwash desire for no war, was explicitly in the public domain.

The Pugwash Continuing Committee agreed to meet 31 March to 11 April, 1958 in Lac-Beauport, Quebec, Canada. They chose the theme, “The dangers of the present situation, and ways and means of diminishing them. This time 47 scientists were invited, and 22 attended from Australia, Canada, China, Federal Republic of Germany, France, UK, US and the USSR.

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BOX: Vienna Declaration of the Third Pugwash meeting 31 March to 11 April, 1958

Again the scientists stress that a full-scale nuclear war would be a “world-wide catastrophe of unprecedented magnitude”.

They recognise that the Arms Race is both a result and cause of distrust between nations. They welcomed the agreement between East and West about the feasibility of detecting nuclear-test explosions.

By now, and in little more than a decade since Hiroshima, the nuclear powers have acquired significant stockpiles of weapons. If a substantial proportion of that arsenal were dropped, then the belligerent states would be totally destroyed, and most of their population killed. They write that given the technical difficulties of verification, scientists think governments need to develop policies which encourage international trust. They point out that even tactical nuclear weapons now have a wide radius of impact. Whilst not being able to be precise about projections of impacts on the germ-lines of all the Earth's inhabitants, the Scientists say they think the resulting radiation-induced mutations will have serious consequences for any surviving world population.

By the time of this declaration Henry Kissinger has come up with the option of limited nuclear war. The Vienna Declaration takes a dim view of the concept. They think exposure to radioactive fallout is undesirable.

They wrote,

“...our increasing understanding of how the forces of nature influence living conditions show us ... The prosperity of individual nations is connected with and dependent on that of mankind as a whole...

“Given peace, mankind stands at the beginning of a great scientific age.” Rotblat (1962, P 56)

CHRONOLOGY

16 July, 1945, Test by US of the first atom (A) bomb.

6 August, 1945, The US drops an A-bomb on Hiroshima, Japan.

9 August, 1945. The US drops an A-bomb on Nagasaki, Japan.

15 August, 1945.
Emperor Hirohito surrenders unconditionally.

29 August, 1949. USSR tests its first A-bomb. See: <https://nsarchive2.gwu.edu/nukevault/ebb286/index.htm>

3 October, 1952. Britain tests its first A- bomb. See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82886/Key_Events.pdf and http://www.nationalarchives.gov.uk/films/1951to1964/filmpage_oper_hurr.htm

1 November, 1952. US Tests the first Hydrogen (H) bomb on Eniwetok Atoll in the Pacific ocean Marshall Islands. <https://nsarchive2.gwu.edu/nukevault/ebb286/index.htm>

1957. Note declassified in **2014** by the US written by a US observer of the first British nuclear test in the Pacific. <https://www.archives.gov/files/declassification/isca/pdf/1999-006-doc1.pdf>

15 May, 1957. First British H-bomb test. See: <http://press-files.anu.edu.au/downloads/press/n2626/pdf/ch12.pdf>

13 February, 1957. First French nuclear test.

16 October, 1964. The Peoples Republic of China explodes a nuclear device. <https://nsarchive2.gwu.edu/nukevault/ebb488/>

A-Bombs are fission bombs, splitting heavy Atoms, such as uranium, with the release of radioactivity and unleashing huge destructive energy.

H-bombs are fusion bombs, which release energy when hydrogen atoms fuse.

The International Day against nuclear testing is 29 August. <http://www.un.org/en/events/againstnucleartestsday/history.shtml>

Over two weeks this select group explored three themes: the dangers of the present situation; means of diminishing the immediate dangers; and means of relaxing tension. As with the first Pugwash meeting the attendees were a roll call of the great and good of science. This time Jerome Wiesner*, who went on to be science advisor to President Kennedy and to be President of the Massachusetts Institute of Technology, was among their number. Topics discussed amid their themes were: technological accident leading to war because of a conflict between small nations; the biological hazards caused by fallout; problems associated with proliferation; problems resulting from development of long-range rockets; problems associated with bases on foreign territory; the political and technical aspects of a ban on tests; problems of political and military stabilization; short and long term policies for promoting peace; co-operation between nations on joint projects that are constructive; student and scientist exchanges; and measures for promoting international trust.

Others attending included Linus Pauling (Nobel Prize in chemistry in 1954) and Professor Chou Pei Yuan who became President of Beijing University, and C. H. Waddington from the UK.

The conference decided not to publish their deliberation for the public at large, but said that the conference materials would be made available to interested governments, and disseminated to results of the conference to fellow scientists.

They decided that their next conference would be about “Peace in the Atomic Age.

That next meeting was held in Kitzbühel and Vienna, Austria 14-20 September, 1958. It resulted in the Vienna Declaration (See Page 16). The end of that declaration reads,

“The increasing material support which science now enjoys in many countries is mainly due to its importance to the military strength of the nation and to its degree of success in the arms race. This diverts science from its true purpose, which is to increase knowledge, and to promote man’s mastery over the forces of nature for the benefit of all.”

That was the outlook in 1958.

*President emeritus Jerome Wiesner is dead at 79, October 26, 1994. MIT News

<http://news.mit.edu/1994/weisner-obit-1026>

See also: <https://pugwash.org/>

The early Pugwash story and its links to international science and arms control will be continued in later issues this year,

A SELECTION OF BACKGROUND READING

HISTORY AT STATE

EXAMPLE OF A TELEGRAM FROM DELEGATES AT THE UN DISARMAMENT TAKS IN LONDON, WHICH ENCOMPASSED NUCLEAR TESTING. AUGUST, 1957.

Telegram From the Delegation to the Subcommittee of the United Nations Disarmament Commission to the Department of State₁ <https://history.state.gov/historicaldocuments/frus1955-57v20/d275>

UNODA

Documents on Disarmament 1945-1959 from the UN Office on Disarmament Affairs.

http://unoda-web.s3-accelerate.amazonaws.com/wp-content/uploads/assets/publications/documents_on_disarmament/1945-1956/DoD_1945-1959_VOL_I.pdf

RAND

The issue of nuclear test cessation at the London Disarmament Conference of 1957 :

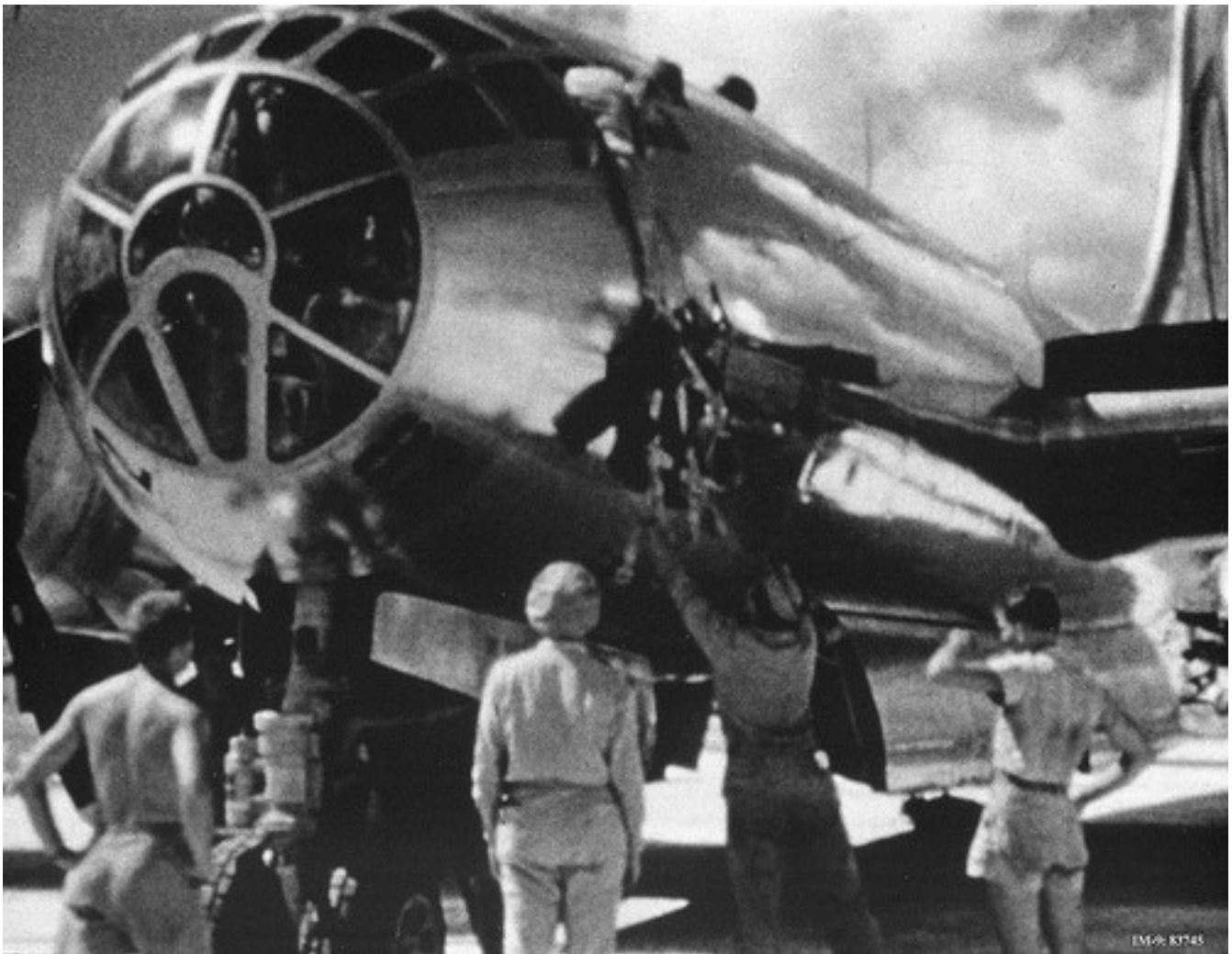
a study in East-West negotiation https://www.rand.org/pubs/research_memoranda/RM2821.html

The Enola Gay

The aircraft which dropped the atom bomb on Hiroshima was called the Enola Gay. Amid much controversy the Boeing B-29 Superfortress was restored by the US National Air and Space Museum. Reassembly began in 1984, and was completed in 2003. In the mid 1990s I wrote for *Nature* (or *New Scientist*—I forget which) about the debate sparked by the work. I also visited and interviewed for the BBC World Service those key workers undertaking the task.

Helen Gavaghan.

NASM Press release: <https://airandspace.si.edu/newsroom/press-releases/national-air-and-space-museum-completes-restoration-enola-gay-udvar-hazy> Accessed 17.3.2018.



CREDIT: Los Alamos National Laboratory History Images.

A proposal to join trade policy, markets and genetic diversity for global food security

The UN has a wish list of 17 goals intended to make the world a better place. Ending hunger and malnutrition, while attaining food security, genetic diversity and sustainable agriculture is the second of these. **Graham Dutfield**©, professor of international governance at the School of Law, University of Leeds in the UK, here explores how policies affecting trade and markets can help achieve UN goals for genetic diversity in global food security and promote benefit sharing.

This paper was delivered on 16 March 2018 in Buenos Aires, Argentina to a conference attended by private invitation, and organised by the International Centre for Trade and Sustainable Development of the UN Food and Agriculture Organization.

GOAL 2.5. "By 2020 maintain genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species, **including** through soundly managed and diversified seed and plant banks at national, regional and international levels, and ensure access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed"

CLICK ON TARGETS AND INDICATORS AT THE FOLLOWING URL TO REACH THE ABOVE TEXT [HTTPS://SUSTAINABLEDEVELOPMENT.UN.ORG/SDG2](https://sustainabledevelopment.un.org/sdg2).
ACCESSED 29.3.2018

SEED AND PLANT BANKS clearly have a central role in achieving effective maintenance of genetic diversity, but the word 'including' keeps the door open for other approaches. *In situ* genetic resource management must be considered one such alternate. The rest of Goal 2.5 concerns access to genetic resources and benefit sharing from their use and use of associated traditional knowledge. Such access and benefit sharing requirements are agreed already through relevant international [legal] instruments.

FOOD SECURITY

Increasing productivity per hectare of land is crucial as the global human population rises and the proportion of people producing food diminishes, whether the producers are farmers, fishers, pastoralists, or hunters and gatherers. Increased food productivity per hectare does not alone improve food security. Nutritional quality across all foods humans consume, rather than just the main staples like wheat, potatoes, maize, soya bean and rice, is also essential. Both quantity and quality are vital. Increasing both without achievement of one being at the expense of the other needs innovative effort. Neither small-scale farmers in agriculturally biodiverse areas, nor those applying modern scientific knowledge and techniques, can do all of this alone.

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This article was invited by the editor, Helen Gavaghan.
Line editor: Helen Gavaghan.

All efforts to improve the quantity and nutritional standard of food depend on genetic diversity, the primary source of the variability that farmer-breeders, pastoralists and plant and animal scientists alike work with to develop plants and animals that enhance food security and support productive livelihoods. All of these groups contribute to agricultural innovation, undertaking work which ultimately is of benefit to all humanity. Albeit what they do is not necessarily undertaken in a co-ordinated way.

Local farmers' varieties (Halewood and Lapeña 2016; Louwaars and De Boef 2012) and wild relatives of crops (Castañeda-Álvarez et al. 2016; Montenegro 2016) continue to be important for integrating new traits or new variants of known traits (eg disease resistance), and their use and existence is important for breeders and local/indigenous communities alike. Being conservers (through their use of agricultural biodiversity) and crop improvers (through their selection practices and experimentation on their farms), such cultivators provide an essential service to breeders and to the majority of people who do not cultivate food. That link demonstrates why global food security requires access to genetic resources to be open. The Food and Agriculture Organization (FAO) International Treaty on Plant Genetic Resources for Food and Agriculture acknowledges this reality, establishes a multilateral system of facilitated access to plant genetic resources, while respecting national sovereignty and requiring benefit sharing.

The conservation and protection of genetic diversity, be it *in situ*, in seed banks or plant collections is a global public good. SDG 2.5 is a timely recognition of that good. It also underlines that access to genetic diversity should remain available to all, especially to those whose livelihoods depend on such access, but also for scientific research purposes. The linking of access to fair and equitable benefit sharing from the utilization of genetic resources and traditional knowledge emphasises that the access rights of provider communities require particular attention. In addition, in line with the Nagoya Protocol to the Convention on Biological Diversity (CBD) and the FAO International Treaty (mentioned above), the provider communities should receive their due from benefits accrued by scientific and commercial users.

THE TRADE LINK

Trade could help attain equitable access to genetic diversity by encouraging increased productivity and incomes for small producers, by facilitating access and circulation of plant genetic resources and relevant technologies, by increasing employment in rural areas, and by providing new opportunities for value addition at the farm source. None of these outcomes arise automatically from trade. The right policies must be in place. International fora for negotiation on trade and related matters, multilateral institutions and agreements relevant to trade, as well as the shifting and evolving architecture of preferential trade agreements create policy spaces for dialogue about food and genetic diversity, as well as other Sustainable Development Goals.

International cooperation is essential, but governments also have broad freedoms to operate independently, and it is important to identify where opportunity lies. What challenges does the international community face in a global food-security context if, by adopting new trade and market-related actions and policies, governments and international organizations are to advance access to and equitable and fair sharing of benefits arising from genetic diversity?

PLANT AND ANIMAL INNOVATION

Given that food security depends on access to sufficient quantity of nutritious edibles, innovation is needed to boost both productivity and nutritional quality of crops. From early times, farmers have set aside some of harvested seeds for replanting. They selected on the basis of plants producing desirable traits such as high yields, disease resistance or drought or frost tolerance. Over the generations this practice resulted in ever-increasing quantities of locally adapted varieties known as 'landraces' or 'farmers' varieties'. In parallel wild plants and animals became domesticated, taking advantage of the opportunities provided by human habitation to spread onto the disturbed terrain or, in the case of the animals, to scavenge for food. While human selection ultimately had a massive effect, domestication was a normal evolutionary* response to the formation of new ecological niches which selectively advantaged individuals with certain traits. People preferred edible plant species, and cultivated them.

Plant innovation is inherently cumulative. Improved crops contain old genetically-encoded traits that are recombined in new ways. These form a large proportion of the stock of breeding material already in wide circulation among breeders. However, stock includes also varieties acquired from genetic material newly or only recently circulated as breeding material, hence the vital importance of seed banks and plant collections. In addition, varieties hitherto found within and around the fields of local and indigenous cultivators may also be used.

Some human populations inhabit areas within the centres of origin of major crops such as rice, wheat, maize and potatoes; sites identified initially by the great early twentieth-century Russian geneticist Nikolai Vavilov**. These centres remain repositories of crop genetic diversity *in situ*, and they continue to evolve and co-evolve with human societies. This makes the centres strategically important for food security, conservation, plant breeding and commercial activity, including biotechnology. Despite genetic erosion, which in many places can be severe, and the existence of large *ex situ* collections, including those held by the agricultural research centres overseen by the Consultative Group on International Agricultural Research, the centres identified by Vavilov continue to be 'natural' seed banks.

The hyper-abundance of food in the developed world and the overall alleviation of under-nutrition are largely attributable to modern agriculture, including varieties in common use. However, malnutrition (undernourishment, obesity/over-nutrition and 'hidden hunger' or micro-nutrient deficiencies), which is due to both under consumption and overconsumption, and low-quality diets, with all the associated health problems from diabetes to nutritional deficiency diseases, continue to afflict millions around the world. By focusing on ending hunger and malnutrition, the SDGs reflect the growing awareness that an exclusive focus on undernutrition is inadequate (See Díaz-Bonilla and Hepburn 2016).

*Introduction to evolution from University of California, Berkeley.

https://evolution.berkeley.edu/evolibrary/article/evo_01 Accessed 29.3.2018

**Nikolai was a Foreign Member of the Royal Society. His work in the first half of the twentieth century continues to be relevant. See, for example: <http://rspb.royalsocietypublishing.org/content/royprsb/283/1832/20160792.full.pdf>

Generating revenues from plant breeding is also a challenge. For varieties that breed true, meaning they have consistent traits generation by generation, farmers and even amateur gardeners can save, clean and replant or sell seeds. Asexually reproducing species can be mass copied by techniques such as cutting and grafting. In response, biological technologies, such as those for producing hybrids, along with intellectual property (IP) and contract law may be deployed so that breeders can derive revenue from plant varieties that they have developed. Supporters of plant IP claim these rights improve choice of high-yielding varieties. It seems reasonable to accept the likelihood that protection laws, for plant varieties, whether based on the International Convention on the Protection of New Varieties of Plants ('the UPOV Convention') or not, incentivise overall investment in commercial crop breeding. The rights also create a market for foreign and domestic breeding material through licensing. The evidence is ambiguous, but suggests increased investments are targeted primarily at a limited set of commercial crop types. Moreover, patents may interfere deleteriously with the balance that plant variety protection seeks to strike between the interests of commercial breeders and the interests, rights and freedoms of farmers. From the perspective of a small-scale farmer with limited resources, the exclusionary legal and regulatory norms underpinning seed development and circulation, including IP rights, raises specific concerns.

As significant as it is to promote plant innovation for food security, it is important not to disregard the capabilities, needs and interests of small-scale farmers. In the past these were generally overlooked by policy makers involved in promoting innovation, rural development, trade and food security. Top-down models of rural development as typified by the Green Revolution increased food productivity overall to the benefit of many farmers and consumers. However, in some places there were heavy social and environmental costs, and food security could, on occasions, be diminished. For example, in the 1960s, Balinese farmers were forced to plant the modern high yielding varieties of the "Green Revolution", and to purchase industrial chemical inputs. Those farmers suffered reduced productivity, crop disease and pest outbreaks. When they returned to their own varieties and original management systems and practices of irrigation and fallowing, high productivity and sustainability recovered (Lansing 2007).

So there are good reasons why small-scale farmer innovation should be allowed to persist, and be supported. IP laws and seed regulations, including compulsory seed lists like the European Agricultural and Vegetable Common Catalogues, may have the effect of reducing local farmer autonomy and their freedom to innovate. IP and plant variety protection, as provided under the UPOV Convention, may have disruptive effects if they are drawn up in ways that narrow or eliminate the rights of farmers to replant and exchange saved seed. The latest version of the UPOV Convention (1991), which most UPOV members are now party to, retains flexibilities in this regard.

Seed regulations may also reduce farmer autonomy if they require that the only cultivated varieties sown by farmers be those on an official seed list, and that farmers' varieties be mainly or entirely excluded for failing to meet strict, inflexible criteria (see Halewood 2016). Unfortunately, in many parts of the world, workable local agricultural systems

have been disrupted, or even replaced, as in the Bali example above. One should not be romantic about traditional agriculture. Many such systems have been degraded through no fault of local people, and no longer function as they did. Factors damaging traditional agriculture include: population increases; spread of market economies; assumptions that supposedly advanced scientific approaches, such as rapid intensification through high-input monocultural agriculture are superior to local ones like intercropping or agroforestry; and the imposition of inappropriate laws and regulations by governments. Nonetheless, small-scale agricultural systems based on plant genetic diversity exist still in many places.

In reality tradition and modernity operate in the same world. The dichotomy placed on them by government policies and international agreement is largely false. Their frequent separation in rural development policy is, arguably, a missed opportunity to seek ways to pursue mutually beneficial hybrid solutions. The situation may be changing. Some good results have been achieved by reviving traditional crop species and introducing modern post-harvesting technologies that enhance the viability of old varieties and species (Cruz 2004). Traditional farmers sometimes select modern varieties. Interaction of traditional knowledge with agricultural techniques applied to local or exotic crops is fertile ground for innovation in many parts of the world.

The Quaker United Nations Office, for example, notes that agricultural innovation is more widely understood as one “inherently social in nature”.

“Individuals and communities in specific localities share and adapt local knowledge, selectively integrate ‘scientific’ knowledge, and develop new and better ways of managing resources, responding to opportunities and overcoming local challenges”.

QUNO 2015

The QUNO adds that “A broader understanding of innovation in agriculture inspires a reconsideration of the type of policy measures that are needed to nurture and support it”. Such reconsideration raises questions beyond the scope of this article, but it must surely involve a reassessment of the legal systems aimed at promoting plant innovation.

Compared to plants little attention is paid to the connection between IP and animal breeding or to pastoralism more generally. Given the role of pastoralism in rural livelihoods, the relevance of animal products for food security, and the reduction of livestock biodiversity around the world, the global community needs to consider the imbalance. Breed society membership and use of pedigrees affords animal breeders some IP benefits. Currently the UK government recognises 42 cattle-breed societies dealing in pedigree animals, 34 sheep breed societies, five pig breed societies and one goat breed society. Not all have active breeding programmes, and some may be concerned more with preservation than improvement. There is an operational UK market in livestock semen, ova and embryos, and purebred individuals for mating. This trade has never depended on IP Rights (IPR). Genetic erosion has become a serious concern with domesticated animals, as with crops, and the genetic erosion requires policy attention.

FUNDAMENTAL CHALLENGES

Small-scale farmers have a wealth of knowledge and expertise related to genetic diversity. They maintain and supply valuable chemical and informational storehouse for which they are not being adequately rewarded. They do not only maintain genetic diversity *in situ*, but use this diversity to be major providers of global food security.

In 2015 the FAO, World Food Programme (WFP) and International Fund for Agricultural Development (IFAD) reported that an individual or family ran 90 percent of 570 million farms worldwide, and in terms of value produced more than 80 percent of global food. Those headlines disguise poverty. “While small farms tend to have higher yields than larger farms, labour productivity is less and most small family farmers are poor and food insecure.” The productivity issue matters globally because these small farms produce food that may “deliver a broader array of vital micronutrients than modern varieties (Morris and Sands 2006). The need is to redesign food systems so that healthier diets for all, rather than food quantity, is brought into policy maker focus, according to the Global Panel on Agriculture and Food Systems for Nutrition (2016).

While official statistics demonstrate food production globally has soared and that this has benefited millions of people (Díaz-Bonilla and Hepburn 2016), food security remains a problem with millions going hungry or suffering diseases caused by poor nutrition. Meanwhile agricultural biodiversity is encountering huge stresses.

To leverage the expertise of rural development, plant and agricultural scientists without inadvertently damaging food security or plant genetic diversity a close engagement with small-scale farmers is probably essential. Yet the sustainability of small-scale farms in food production, good nutrition and the conservation by use of genetic diversity is under threat. Small-scale farmers continue to encounter neglect from policymakers. Despite their massive contributions to global food security and genetic resource management, small-scale farmers tend to suffer from extreme poverty. So sustainability goal 2.5 needs be read in tandem with sustainable development target 2.3 to increase the productivity and incomes of small-scale farmers.

Indicators of how effectively the goal of access to genetic resource is being met are:

- A) The number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities.
- B) Proportion of local breeds classified as being at risk, not-at-risk, or at unknown level of risk of extinction.

Both are vital outcome measures for Goal 2.5. Small-scale farmers with sophisticated agro-ecological knowhow, innovations and practices have much to offer by identifying and classifying varieties and breeds. Partnerships between farmer and pastoral communities with the formal plant science sector, including the seed banks, need to be established. Small-scale farmers and their communities may have their own conservation priorities, and their own taxonomies. In this context it is worth noting a provision of the CBD, which

has not attracted the attention it deserves. Article 18.4 requires parties to 'encourage and develop methods of cooperation for the development and use of technologies, including indigenous and traditional technologies, in pursuance of the objectives of this Convention. For this purpose, the Contracting Parties shall also promote cooperation in the training of personnel and exchange of experts.'

Common approaches enabling relatively unrestricted exchange of plant genetic resources are desirable. In Peru, for example, an association of six rural communities called the Potato Park negotiated the repatriation of potato varieties held by the International Potato Centre in Peru. The association has become a strong advocate of sharing plant genetic resources and appropriate technologies without the use of IPR. The Park is also shares its own varieties with farming communities around the world.

Part of the UN's development goal on food security advocates increased investment, including in 'agricultural research and extension services, technology development and plant and livestock gene banks'. Ideally, a substantial portion of such investment should be targeted towards the needs of small-scale farmers in the dual roles of producers and guardians of plant genetic diversity. At present, such targeting tends to be lacking. The Global Panel on Agriculture and Food Systems for Nutrition sums up the imbalance:

“The Consortium of International Agricultural Research Centers (CGIAR), which commands the most significant capacity to conduct agricultural R&D in low- and medium-income countries, still allocates about half of its resources to rice and maize. In the private sector about 45 percent of research investment is directed towards just one crop: maize.”

Though agricultural intensification and widespread use of scientifically bred seeds has increased agricultural production and contributed to food security, intensification needs to do better at sustainably balancing food security with protection of genetic resources.

Intensification tends to be associated with large-area cultivation of only a few genetically uniform varieties of the major crop species like rice, wheat, maize and soybean. Staple varieties with traits adapted to farming conditions of different ecosystems are neglected. IPR is not generally an incentive to invest. Reforming IP laws should be considered. There is much to gain in working with communities to improve locally important crops, which are neglected by the private sector. There is concern that the pursuit of higher yield leads to crops with better nutritional value being neglected because they do not have a large market. This situation was referred to in an authoritative article as 'the breeder's dilemma' (Morris and Sands 2006). Access to a broad range of genetic resources is important. Seeds laws also need to be flexible so as to accommodate crop species' genetic diversity and to permit the use and circulation of varieties that are genetically more heterogeneous than modern varieties typically are. It is noteworthy that the European Union has shifted direction somewhat in this regard and is now more flexible than it was in permitting the commercial cultivation of local varieties.

To enhance nutritional quality and cater to the needs of resource-poor farmers in marginal

areas, agricultural research needs to focus more on “Neglected and Underutilized Species”. It also needs to be more sensitive to needs and constraints experienced by small-scale farmers (Ceccarelli et al. 2009).

Patents and plant variety protection could do more to help reverse the tendency of the private sector to focus on large-scale industrial agriculture and a narrow range of crop species. Concluding plant variety protection and patents are needed for innovation assumes plant innovation takes place only off-farm by scientific breeders and biotechnologists, and that the private sector alone is responsible. That ignores innovation from the public sector and farmers (farmer-breeders) in both plant innovation and maintenance and enhancement of agricultural biodiversity. See Pelegrina and Salazar (2011).

There are plausible arguments that IPR for plants and genetic resources, as provided under agreements such as UPOV and the WTO Agreement on Trade-related Aspects of Intellectual Property Rights, fall short in terms of encouraging agricultural genetic diversity. However exploiting allowable exceptions and flexibilities in IP laws may offer some advantages over the present situation. Well-designed and culturally-appropriate commons approaches may be worth exploring too (Girard and Frison 2018).

FAIR AND EQUITABLE SHARING OF BENEFITS FROM GENETIC RESOURCES

In 2010, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits Arising from their Utilization was added to the CBD. The protocol acknowledges agricultural biodiversity requires distinctive solutions compared with other kinds of biodiversity. Due to the interdependence of all countries on the same global pool of genetic resources for food and agriculture the Protocol accepts the primacy in this regard of the FAO International Treaty on Genetic Resources for Food and Agriculture, which puts in place a multilateral system of facilitated access to genetic resources for food and agriculture, which also contains benefit sharing provisions.

Likewise, the FAO International Treaty promotes benefit. Pooling resources is the best way to promote innovation as long as access is sufficiently equitable to reach small-scale farmers. Article 9 promotes the concept of farmers' rights as a way to recognise 'the enormous contribution that the local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world.' Implementation of farmers' rights is the responsibility of national government who must adopt, at least, the following measures:

- (a) protection of traditional knowledge relevant to plant genetic resources for food and agriculture;
- (b) the right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture; and
- (c) the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

ROAD MAP FOR GOVERNMENTS AND THE INTERNATIONAL COMMUNITY

Small-scale farmers, especially those in the centres of origin and diversity, must be helped to maintain genetic diversity. Trade and market-related efforts must be just. More opportunities to trade in agricultural products on the basis of local value addition can incentivize support for genetic diversity. Branding schemes can play a useful role (Swiderska et al, 2016). Trademarks, including collective and certification marks may be equally useful, as may geographic indications. The TRIPS Agreement provides norms for geographical indications and trademarks.

G20 members should request the World Trade Organization, FAO and World Intellectual Property Organization (WIPO) to hold an international forum, as well as regional forums, on how to create incentives to carry out research on underutilized and neglected crop species, in collaboration with small-scale farmer communities, whose participation would need to be funded.

Preferential trade agreements should contain commitments for technical cooperation in providing geographical indications and trademarks for local products that add value to genetic diversity. Preferential trade agreements with IP chapters should not contain provisions requiring countries to implement the 1991 UPOV Convention allowing the patentability of plants. The issue is not that UPOV 1991 or plant patents are inherently harmful, but that introduction of IP protection to cover innovations in the agricultural field needs to carefully take account of local conditions.

Insofar as plant IP is provided in preferential trade agreements, parties should be free to adopt *sui generis* regimes for plant varieties, including in those agreements providing exceptions and limitations to rights, and which do not place restrictions on what small-scale farmers can plant, and on how they may dispose of their harvested produce. It should be noted that the benefits of such flexibility would be enhanced by seed laws that are sufficiently flexible to allow farmer varieties to be cultivated and circulated.

Parties to the FAO Treaty should consider adopting an interpretative statement that “the local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, [who] contribute to the conservation and development of plant genetic resources, which constitute the basis of food and agriculture production throughout the world” are in fact breeders as well as farmers. Accordingly their participation in the implementation of the treaty, including their opportunities to benefit from the multilateral system of facilitated access should be enhanced. In a similar vein the concept of farmers' rights should more explicitly accommodate the specific interests of small-scale farmers who also contribute to maintenance of genetic diversity through breeding as well as conservation.

The FAO has provided a vital forum to debate the erosion of animal livestock genetic resources. However, though there is a treaty dealing with plant genetic resources, there is no binding international norm addressing the erosion of livestock animal genetic diversity. The Conference of Parties to the Convention on Biological Diversity deals with biological diversity more generally and does not seem to be a suitable forum, given the specific nature of animal genetic resources. G20 Members should consider initiating formal discussions on how to address the problem of animal genetic-resource erosion through international cooperation. This process requires the FAO, which is already works in this area, as well as scientists, animal breeders, breeder organisations, keepers of rare breeds, and local and indigenous livestock keepers, especially in developing countries. In promoting the involvement of the latter, consideration of the emerging concept of 'livestock keepers' rights', analogous to farmers' rights, should be introduced as an operational concept (Köhler-Rollefson et al, 2010).

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Donkey riding: the roots of democracy.

Dateline. Friday 16th March, 2018.

Behind me at the community meeting with the local MP, Craig Whittaker (Conservative), sat a grandmother and grandfather. They said their granddaughter is in prison and is addicted to cocaine and heroine. They wanted to lock up those who sold the dope which had hooked her, and to throw away the keys. These were gentle people who, in distress at their granddaughter's addiction and her criminal behaviour to feed her addiction, were - metaphorically - not averse to the re-institution of hanging, drawing and quartering for those peddling addictive drugs.

On the podium of the small room along with the MP sat local Ward Counsellor, Jill Smith-Moorehouse (Conservative), and a uniformed police sergeant. The topic broadly was anti-social behaviour. Next to me in the audience sat parish councillor, Christine Bampton-Smith (Liberal Democrat). On the back row was a retired teaching assistant. At the other side of the room was a 17-year old who, it emerged, had been refused entry to the sixth form at the local High School (nothing to do with drugs etc...). The meeting learned about her refusal by Calder High after I had asked Mr Whittaker why Calder High was closing its sixth form, and what impact the lack of a sixth form between Todmorden and Halifax had on aspiration. I didn't understand the answer. But I think I learned that "Tod High", where I had once been a volunteer teen mentor, had also (or was also) closing its sixth form. I asked where young people can "hang out" in the Calder Valley. In my mind was the issue of where, in the absence of coffee shops (think of Samuel Pepys) open at night young people could gather and chat in a non-school, non-monitored, non-alcoholic public setting.

The young woman seemed open to the idea of attending Ward Council meetings, Calderdale Council Finance Committee Meetings and its main Council Chamber. By contrast the elected representatives did not look enormously enthusiastic at the thought of invasion by articulate 17-year olds. How does one find out about meetings such as the one we were attending asked the 17-year old? We mentioned Google and local Libraries are both worth monitoring. Then she pointed out one difficulty is not knowing what meetings to look for.

Others wanted to know about how to report what looks to be criminal behaviour. The police representative assured the meeting that West Yorkshire Police (WYP) has mechanisms for anonymous reporting, and said WYP do not have any "no-go areas". Later I asked Cllr Smith-Moorehouse if it was worth exploring with the judiciary if sentencing guidelines for those peddling small amounts of drugs are adequate to the task of stopping addiction before it starts. She favoured a proposal voiced from the floor that there should be zero tolerance signs in Mytholmroyd, warning that suspected dope peddlers would be reported to West Yorkshire Police Crime Stoppers.

Word to the wise: any young people attending the Council Chamber: remember to stand when the Mayor enters. The north remembers Vikings.

Helen Gavaghan, Mytholmroyd.

Crimes of violence

20th February, 2018 (*This report is modified from the news report published contemporaneously on gavaghancommunications.com*).

Hospital staff withdrew medical support from - - (32) at 4am on 18th February 2017. He died from at 4.22 am from injuries which could not have been survived. The Court heard detail of the injuries read in testimony, agreed by prosecution and defence to be non Contentious. The evidence read to the jury was provided by paramedics who had attended at the scene. Agreed evidence from emergency medical staff at Leeds General Infirmary and others was also presented in Court.

Later that day, at 14.38pm, the dead man's father formally identified his son's body. The driver of the car which killed "the victim" was disqualified, allowed on the road only under supervision, according to the terms of his provisional licence. The driver's passenger, and co-accused on murder and manslaughter charges, was not a driver.

Even though, as became clear during the trial, the driver thought he had run over someone, he did not contact emergency services. Today at Bradford Crown Court a jury acquitted "accused one" [correction: -an NOT -en - the error is mine, not Court documents. 21.2.2018.] (20) of East Ardsley and "accused two" (21) from Thornhill, Dewsbury of murder, but found them guilty of manslaughter.

The fatal collision took place at The Scarborough pub, in a car park opening onto The Town. The pub is located in the outskirts of Dewsbury.

(Paragraphs relating to extensive related violence removed because not relevant to the purpose of publication in this magazine.)

Informally Detective Sergeant Richard Smith of the West Yorkshire Police Homicide and Major Incident's Unit told me he did not think racism was the cause of the violence, and that drugs were irrelevant to events. Yet "accused one" insisted to the Court he had heard some deeply unpleasantly racist words said, which he took to be aimed at himself. Other witnesses denied hearing the words "accused one" heard.

Before the jury returned with their verdicts on the murder and manslaughter charges, Mr Justice Goss said that if anyone disturbed the decorum of the Court they would be removed and not allowed to return. The judge thanked the jury for their diligence.

Explanation:

I wrote the above news because it is about events in the constituency of murdered MP Joe Cox. I have walked from Dewsbury train station past the closed building of the *Dewsbury Reporter*. My mother's family come from the rural part of Thornhill. Save Dewsbury Hospital are among my twitter followers (or they were) . I wanted to know if there are connection between events of violence and life in the semi-rural community of a murdered MP. **Helen Gavaghan.**

Quiz

1. How many Russian embassy staff did the UK expel in March, 2018?
2. Which British consulate did Russia close as part of its retaliation?
3. Who won a fourth term as the President of Russian in March, 2018?
4. Who is the EC's lead negotiator with Britain on the UK's withdrawal from the EU?
5. At which website can one consult UK legislation?
6. What is the aim of the Space Industry Bill going through parliament this quarter?
7. What does EMBL stand for?
8. Who is the President of the International Court of Justice?
9. What is the purpose of UNCITRAL?
[http://www.uncitral.org/uncitral/en/about_us.html]
10. What does GDPR stand for?

ANSWERS

1. 23
2. St Petersburg
3. Vladimir Putin.
4. Michel Barnier
5. <http://www.legislation.gov.uk/>
6. Regulation of launching small satellites and space launchers from UK spaceports.
7. European Molecular Biology Laboratory.
8. President Abdulqawi Ahmed Yusuf [<http://www.icj-cij.org/en/current-members>]
9. Modernizing and harmonizing the rules of international business.
10. Global Data Protection Regulation. <https://www.eugdpr.org/>

SCIENCE, PEOPLE

&

POLITICS

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