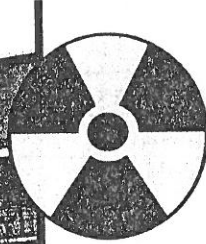


THE TWO SIDES OF INVENTIONS



Scientists push forward the boundaries of knowledge through their investigations and research. Sometimes their discoveries and subsequent inventions can lead to unforeseen consequences for humanity.

In April 1986, reactor number four at the Chernobyl nuclear plant exploded and the explosion sent radioactive fallout (400 times greater than that of the bombs dropped on Hiroshima) into the air. It is estimated up to 200,000 people died from the explosion and subsequent contamination.

DEADLY BUSINESS

Alfred Nobel (1833–1896) caused many big bangs in the industrial world when he invented dynamite in 1867. It could be used in coal mines and quarries much more safely than the very volatile nitroglycerine that was used previously. Dynamite also helped with the construction of the railways across North America, where rock had to be blasted to make way for the track.

During the last ten years of his life he became involved in the development and use of weapons technology. Dynamite was first used as a weapon in the Franco-Prussian War (1870) by both sides. An invention developed for practical purposes had soon become part of warfare with Nobel's assistance. Was he aware of the negative impact of his invention on modern civilization? Considering his words, probably not: "Perhaps my factories will put an end to war. On the day

that two army corps can destroy each other, all civilised nations will be so shocked that they will disband their troops." He did not live to see the slaughter and carnage of the First World War.

When he died, Nobel left in his will the instruction that the remaining capital constitute a fund. The interest is annually divided into five equal parts and distributed as prizes for great achievements in physics, chemistry, medicine, literature and for peace.

And so the name 'Nobel', for long associated with war, is now associated with peace.

SPLITTING THE ATOM

Nuclear fission was first studied in the 1930s when scientists bombarded heavy elements with particles called neutrons. The atoms of the elements split into two. The term 'fission' was coined by Austrian physicist Lise Meitner (1878–1968). These scientists had no idea of the implications of their discovery.

They were just pushing forward the boundaries of scientific knowledge.

The classic example of splitting the atom and the destructive release of energy for war was developed in the Manhattan Project in the USA between 1942 and 1945. In August 1945, mushroom clouds billowed over Hiroshima and Nagasaki. Tens of thousands of people were killed instantly or within hours and many more died soon after. The disastrous longer term effects of radioactivity on human, plant and animal tissue are still being investigated.

No nuclear weapons have been used since 1945, although several countries have them as a deterrent against other aggressors.

The terrible destructive power released as a result of splitting the atom can be used for peaceful purposes in the production of useable energy in power stations.

A GOOD USE... MAYBE

The same physics (nuclear fission) happens in a nuclear reactor, but the release of energy is

controlled and the heat is used to generate electricity. This energy then goes to heat our homes, provide light and run all our energy needs. Scientists call this 'clean energy' because no carbon dioxide (a greenhouse gas) is produced.

Many people think that this is a dangerous activity and point to at least two occasions when scientists have made mistakes in nuclear power stations and radioactive material has been released into the environment. In Europe, the Chernobyl accident in 1986 added to the distrust of nuclear power. The Three Mile Island disaster in the USA was another. However, there is no possibility that any nuclear power station could explode in the way that was seen in Hiroshima and Nagasaki.

All scientists acknowledge that the main unresolved problem with nuclear power is what to do with radioactive waste produced in the nuclear process. Also if there are leaks, dangerous radioactivity stays in the environment for millions of years.

Nigel Haward (UK)

VOCABULARY

push forward the boundaries

['bʌʊnd(ə)rɪz] - posunují hranice
 subsequent ['sʌbsɪkw(ə)nt] - následný
 unforeseen [ʌnfɔː'siːn] - neočekávaný
 quarry ['kwɔːrɪ] - lom
 volatile ['vɒlətaɪl] - nestabilní, výbušný
 to blast - odstřílet, vyhodit do povětří
 warfare ['wɔːfəː] - válčení, válka
 impact on ['ɪmpækt] - vliv, dopad na

considering [kən'sɪd(ə)rɪŋ] - s ohledem na

army corps - armádní sbor

to disband [dɪs'bænd] - rozpustit

slaughter ['slɔːtə] - masakr

carnage ['kɑːnɪdʒ] - krveprolití

will - závěť

to constitute a fund - založit fond

interest - úrok, zhodnocení

nuclear fission ['fɪʃ(ə)n] - jaderné štěpení

particle ['pɑːtɪk(ə)] - částice

to coin - vymyslet slovo, použít poprvé slovní výraz

mushroom cloud - atomový hřib

to billow ['bɪləʊ] - stoupat (o kouři)

within hours - během pár hodin

disastrous [dɪ'zɑːstrəs] - katastrofální

animal tissue - zvířecí tkáň

deterrent [dɪ'ter(ə)n(ə)nt] - odstrašující prostředek

power station - elektrárna

need - potřeba

carbon dioxide - oxid uhličitý

distrust - nedůvěra

to acknowledge [ək'noʊlɪdʒ] - uznat, přiznat

radioactive waste - radioaktivní odpad

if there are leaks [liːks] - pokud dojde k únikům

CAPTION

radioactive fallout [ˌreɪdɪəʊ'rek'tɪv] - radioaktivní spad