THE BRITISH BOMB: Part 2

The wings of the Green Parrot

DUNCAN CAMPBELL gives a portrait gallery of British bomb-types and identifies the architecture of nuclear storage.

WE HAVE BEEN in the nuclear-weapons production business for 28 years. The British nuclear industry is about to produce its fifth generation of weapons. Yet almost no details have been published about the true nature of the British stockpile; nor, consequentially, its implications for the conduct of warfare.

What is certain is that 'nukes' have proliferated into almost every area of military effort. The Army has medium-range nuclear missiles (atomic shells, 8-inch, for howitzer artillery) and 'atomic demolition munitions'. The RN and RAF have Mk 11 nuclear depth-bombs for use against submarines. European and American NATO forces have nuclear-armed surface-to-air missiles. And the biggest stockpile of all contains the hundreds of air-dropped nuclear bombs for use from Britain and Germany.

Inquiry into the nature of nuclear weaponry soon reveals that the claim of an 'independent' British deterrent is over-bold. Many British 'nukes' have been under American control, and many still are. The warheads for use in Polaris and Trident submarines, amongst others, have clearly required large inputs of US technology, and all recent missile or warhead testing has been done under US supervision.

Though the nuclear-stockpile's anatomy is supposed to be a deep secret, the fact is that the characteristics of a nuclear-weapons store make it impossible to conceal — especially from the USSR's satellite-cameras. As usual, the chief purpose of secrecy is to conceal the facts of life (and potential death) from the British public, which thus remains unable to estimate the value of 'Red Beard', 'Green Parrot' and the other oddly-named weaponry on which its tax-revenues have been expended.

BRITAIN'S FIRST nuclear device, code-named 'Hurricane', exploded in 1952 at Monte Bello, off Australia's northwest coast: it was a near replica of the Nagasaki bomb, using plutonium as its core. A year later, according to official sources, bombs based on 'Hurricane' were delivered to the RAF under the code-name 'Blue Danube'.

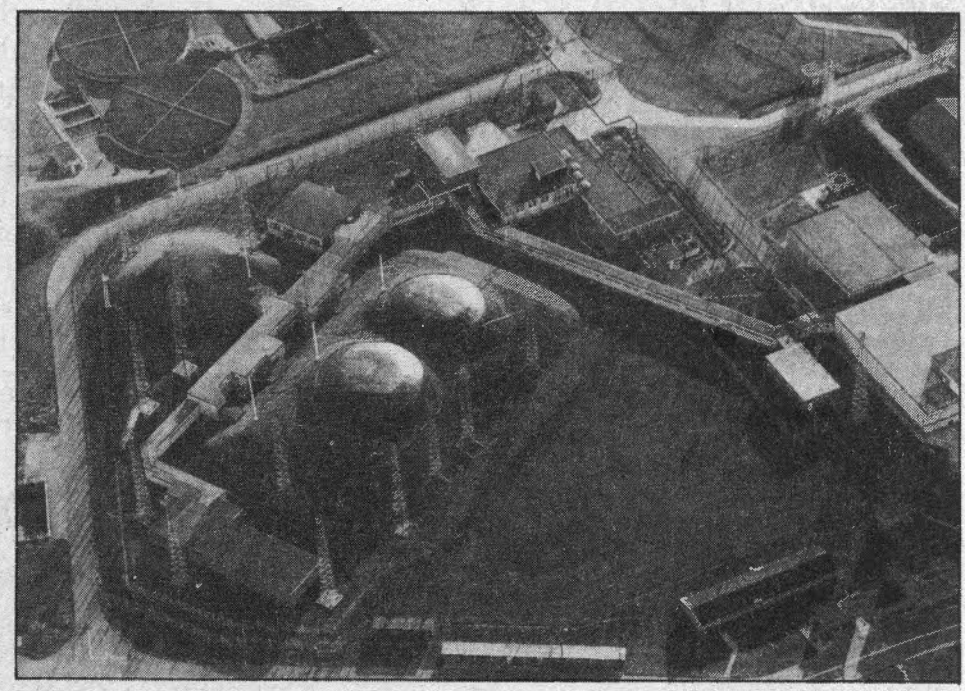
Doubt exists as to whether the Blue Danubes were up to much for some time. Though delivered in 1953, they apparently were not truly 'operational' weapons, and a recently-produced history of the RAF's deterrent role suggests that not even the prototype of a bomb 'suitable for carriage on an aircraft' appeared until 1955. There was little confidence that the bombs would actually be of use until further weapons tests were held in 1956.

A secret specification drawn up in the late-40s had assumed that the 'special' (nuclear) bomb would be 30ft long and 10ft in diameter: very much larger, that is, than the 10ft long 'Fat Man' dropped on Nagasaki. And Blue Danube, when it appeared, was indeed 24ft in length.

Such weapons, like the first US atom bombs, were far from being routinely operational. Most of the parts were to be stored separately, and be assembled only at the last moment before use. And the problems which caused this awkwardness have not since gone away, but merely lessened in intensity.

The plutonium which makes the bomb is fashioned into precise shapes, ready to be 'imploded' together and create a mass sufficiently dense to initiate explosive chain-reaction. But the plutonium elements are highly radioactive, and when brought together within the casing of a weapon the whole assembly may be 'sub-critical', with neutrons and gamma rays being produced at a range capable of doing considerable damage to the bomb's electronic and mechanical components.

Similarly, the 'conventional' explosives which start the bomb going are highly specialised: shaped around the nuclear core in the form of explosive 'lenses', each of which must begin to burn within a few millionths



The nuclear weapons assembly buildings at the Burghfield Royal Ordnance Factory near Reading (below). The buildings here have been the final production and checkout point for British nuclear weapons since the facility was built in 1954. A new assembly building is to be built for the Trident warhead construction. The Burghfield site shows, in extreme form, all the typical characteristics of a nuclear weapons storage facility, as can also be seen at RAF Scampton's (near Lincoln) nuclear Special Storage Area (above). - bunkers, sometimes called 'igloos' encased in concrete and surrounded by earth 'bund' walls; double or even triple security fencing, with closely spaced floodlights; lightning conductors at frequent intervals around and on top of the areas where weapons are assembled or maintained.

Britain's nuclear stockpile — an estimate

Lance missiles with M234 warheads (12 launchers)	84
Nuclear ammunition for M110 8" howitzers (16 guns)	160
Atomic demolition munitions	unknown — a few
Air drop weapons:	
Nuclear Depth Bombs Mk 11, for Nimrods (37), Lynx (52); and Sea Kings (61)	422
Strategic/tactical nuclear bombs, either 600 lb variable yield bomb ('Green Parrot') or 950 lb hydrogen bomb for Vulcans (66), Buccaneers (87), Jaguars (152)	544
Polaris submarines, British A3 or Chevaline warheads	192
TOTAL	1402

These estimates are based on the assumption that weapons are available for each nuclear capable aircraft or helicopter to make one trip with its full nuclear load: either 1 bomb (Vulcans), 4 bombs (Sea King), or 2 (remainder). This is likely to be a conservative estimate, but, equally there may not be enough weapons to cover every aircraft since heavy attrition may be assumed in the early, conventional, phases of a projected war. The numbers of aircraft given are the latest totals of nuclear capable types on RAF or Royal Navy strength. The totals for all except army nuclear ammunition stocks take no account of reserve or maintenance warheads stocks.

of a second of the others, and then proceed according to a microscopically-exact pattern. Such properties are difficult to achieve, and difficult to maintain.

CERTAINLY the first two or three generations of plutonium atom-bombs faced an additional problem, in requiring an 'initiator' at the centre made of polonium and (probably) lithium, designed to give a rapid start to the nuclear process and ensure the development of full explosive power before heat must blow the bomb-mass apart.

Polonium, however, is an unstable artificial element with a half-life of only 138 days, so that the nuclear core of any device which relies on it must be replaced within a few months of assembly. More recent designs of A-bomb, very probably, have initiators which get around the problem of polonium's instability. But the H-bombs which now provide the larger reserves of megatonnage have stability problems of their own.

Together with plutonium, they contain an additional form of nuclear explosive: the hydrogen isotopes deuterium and tritium, combined with lithium as the raw material of thermonuclear fusion. Tritium, present apparently in substantial quantities within any hydrogen bomb, is another man-made element, with a half-life just a little longer than 12 years. An H-bomb, therefore, undergoes quite rapid degeneration from the day of its construction. (In 1976 the Ministry of Defence asked British Nuclear Fuels to build a tritium plant at Chapelcross reactor centre near Dumfries: this was probably tied to the 1979 termination of a treaty under which Britain traded plutonium to America in exchange for tritium and enriched uranium.)

Therefore, the task of keeping the 'deterrent' in order is continuous, accounting for the regular traffic — which we described last week — between first and second-line storage areas, maintenance areas, and manufacturing and reprocessing centres like Windscale. The first task of the Atomic Weapons Research Establishment at Aldermaston is not new research, but — as the Commons Defence Committee was told last year — providing:

> the scientific and engineering expertise needed to support the UK nuclear stockpile.

Few people, perhaps, realise how swiftly the Bomb would starve to death without regular feeding.

The MoD's Assistant Chief Scientific Adviser (Nuclear), D.C.Fakley, told the Committee that all nukes have a 'finite weapon life': initially this had been 'relatively short', but even with 'improvements in techniques' it remained the case that 10 or at most 20 years was the maximum span of a Bomb.

And maintenance problems, even so, remain substantial. The RAF's chief British-made thermonuclear bomb is the '950 MC': it weighs 950 pounds and has 'medium capacity' of around one megaton, 50 times Hiroshima-power. Its sleek, white nine-foot length testifies to the progress of miniaturisation, but 'operational difficulties' remain.

If a 950MC is fully-assembled and slung in the bomb-bay of a Vulcan, or Buccaneer, or below a Jaguar, it is reckoned to last just 30 days. If crisis makes it necessary to remain at readiness, then the time can be extended by three days — but only on the authority of the chief of Strike Command. Presumably the degenerative curve, once established, is rather steep.

Similar problems occur with Polaris missile submarines, where the missiles must remain assembled throughout each 60-day patrol. Each missile carries three close-packed 150-kiloton warheads, which are unloaded and overhauled immediately after each patrol by the RN Armament Depot at Coulport on Loch Long (the location, today, of a civil service strike).

From there, the warheads used to be shipped to Southampton in Royal Naval Auxiliaries — small, unarmed cargo ships — and sent by road to the Burghfield Royal Ordnance Factory, just south of Reading, for dismantling and replacement of sensitive components. After a security row over the danger of trundling warheads across the Irish Sea, rail transport has been substituted (some of the arrangements were described last week).

Official silence, in short, conceals the fact that nuclear weapons are fragile machines, requiring constant attention when on 'alert'. The general estimate of nuclear missile reliability, for example, is that, even in 'optimum' conditions, only 70 per cent of them could be expected to hit the target and explode.

Of course, the fact that Doomsday may be

a cock-up from the strict military point of view will not make it any less nastily lethal for the great bulk of citizens in these crowded islands.

Thus Aldermaston and its related enterprises remain in being despite the fact that enormous megatonnage already exists: the 'deterrent', in its unlovely way, is a living, growing organism. We therefore have, in theory at least, an unspectacular route to nuclear disarmament, in the gradual withdrawal of the tender loving care upon which the Bomb depends.

THE STOCKPILE's contents today probably consist of three basic types of bomb: the Polaris warheads, now 'modernised', and two air-drop weapons. (Our table estimates the roles and numbers in which they appear.)

The commoner air-drop bomb is a versatile device said to be code-named 'Green Parrot': it is the chief 'tactical' nuke, and Buccaneers or Jaguars carry two apiece. 'Variable yield' technology enables Green Parrot (weighing some 600lb) to produce explosive effects between roughly one and 70 kilotons.

Numerous basic bomb-types, thus, are not required, and a variety of time and altitude fuses produce further flexibility. Since Green Parrot can be fused to explode underwater, it no doubt has another manifestation as the Mk 11 nuclear depth bomb.

The other standard device is the 950MC H-bomb, already described. Both turned up in the late 60s, to replace second-generation nukes called 'Red Beard' and 'Yellow Sun'. Red Beard was an H-bomb, apparently Britain's first, and the offspring of tests concluded at Christmas Island in 1958. Less information is available on Yellow Sun, which was probably a lower-yield weapon for smaller aircraft like the Canberra.

Size was much diminished from the monstrous Blue Danube, and the weapons could be stored more handily with all but the nuclear-core 'capsule' in place. This provided some additional safety, for in normal transport the pilots would carry the capsule in their cockpit, thus lessening (at some risk to themselves) the prospect of general damage in a crash.

Arming Red Beard, though, was a hairy process. The fission core (energiser of the main fusion explosion) had to be removed from its canister with a remote-handling tool, inserted through an aperture in the bomb's belly, and locked carefully into place. A trainee's unsteady grip would sometimes release the core, which went bouncing and rolling across the hangar like some other-worldly football.

(Technical separation no doubt provided useful 'cover' against an inquisitive citizenry. Bombs without nuclear material inserted may not be nuclear weapons, and such logic-chopping could have been used to obscure the fact that American nukes were stored in Britain as early as the 1950s.)

THE NUCLEAR industry was slow to produce the H-bombs desired by the RAF, but the successful 1958 tests were followed by agreements for large-scale transfer of US technology to Britain. Therefore, as Lord Chalfont and Harold Wilson pointed out during the 1964 election, the 'independent' deterrent was nothing of the sort.

Important V-bomber bases such as Scampton, Waddington, Marham and Wittering largely relied on US weapons, and the inner guards at the nuclear Special Storage Areas were USAF police. Armed weapons could only be removed with US authorisation, and in some cases they remained under American guard even when aboard aircraft on alert.

By the latter sixties, though, there were enough home-made H-bombs to provide for all the V-bombers, either by way of air-drop weapons or 'Blue Steel' missiles which could fly on 100 miles to target. But RAF nukes in Germany remained under US control until well into the '70s, and the Army's weapons still are. (The 'custodial units' have explicit orders to shoot any non-American NATO personnel who attempt to ready a weapon without US permission.)

Even this modest degree of 'independence' requires one to ignore the massive reliance on American technological assistance, and the likely truth is that the bombs and warheads sheltered inside Special Storage Areas up and down Britain (the US term is Special Ammunition Stores) are little more than adaptations of American designs.

As our illustrations show, the architecture of an SSA is entirely distinctive, and impossible to conceal, especially from satellite reconnaissance.

On most airfields or other bases, they are attached to conventional explosives areas, and remote from aircraft hangars or inhabited quarters. But, although the heavy, earthen 'bund' walls of the bunkers may be similar to conventional ammunition bunkers, nuclear stores always have their own separate set of bunkers. These are characterised by a particular *combination* of features:

- A double chain-link fence, barbed-wire topped, with a dog run in between. Sometimes, electronic movement detectors are fitted in the gaps;
- A large watchtower about 50 feet high, for supervising the site. (Older SSAs were built with a number of smaller watchtowers around the perimeter);
- Close-spaced and very high-intensity floodlighting: an SSA at night is always 'lit up like a Christmas tree';
- Numerous tall lightning-conductor poles, with one at least attached to every bunker. Of course, the chance that an electromagnetic surge from lightning-strike could set off a nuclear fuse-mechanism is remote, but the catastrophe involved would be so severe that the prospect cannot be ignored.

This unmistakable architecture derives, of course, from the deadly and unstable nature of the Bomb itself: the consequence, in a crowded island, is a proliferation of conspicuous targets for the attention of other practitioners of Deterrence. (Of course, the Soviet Union starts with the advantage of a great deal more real estate to spread them around.) What secrecy, so far, has helped to keep from public attention is the detailed unsuitability of nuclear weapons for the defence of a country situated like Britain. □

NEXT: The theory and practice of using The Bomb.

IRELAND

Local polls next stop for IRA

MARY HOLLAND on the Sands victory

WHATEVER Westminster decides to do about its new MP Bobby Sands, one thing is clear — the repercussions of the Fermanagh and South Tyrone by-election result are only beginning. For years British politicians involved in Northern Ireland have been urging the Provisional IRA to test its popularity at the ballot box. The Provisionals have declined, knowing that their chances of winning electoral support were minimal, and knowing too that that was the main reason their opponents suggested adopting such a course. Now they have tried, have won and are likely to try again.

Their first opportunity will be at the local council elections next month. If they decide to put up candidates to fight on the issues of political status for the H Block prisoners they would have a good chance, under the voting system of proportional representation which operates in Ulster, of taking between 15 and 20 seats in Republican areas. As their candidates would almost certainly be, like Sands, H Block prisoners from those areas, this would increase not only their chances of electoral success, but also the emotional temperature of elections which are already fraught with political risks.

Even before the death of Frank Maguire caused the Fermanagh and South Tyrone by-election, Westminster was known to be very concerned about the coming local elections. It was agreed that these would be the real test of support for Rev. Ian Paisley, and, more particularly, for his determined campaign to destroy the new Dublin-London axis, established during Mrs Thatcher's visit to Dublin last December. Despite considerable, united Protestant opposition to the Dublin summit the British government has pressed ahead with the working parties set up to consider 'the totality of relationships between Britain and Ireland'. In the wake of the Sands victory the local elections will be even more important as an indicator of current feelings in the province about the new relationship with Dublin. If the Provisionals do decide to contest them, the most immediate result is likely to be a substantial boost for Dr Paisley, which will in turn have an effect on Catholic voters.

There are more dangers. There must now be considerable anxiety about a possible escalation in Loyalist violence against Catholics. The border country of Fermanagh is one where the Protestant community has suffered dreadfully in recent years from IRA violence, so much so that many Protestants believe that the Provisionals are engaged in a systematic campaign to drive them off their lands. The Sands election will heighten their suspicion that this is being done with the support of their Catholic neighbours, and will greatly increase the pressure on Loyalist paramilitary organisations — such as the Ulster Defence Asso-