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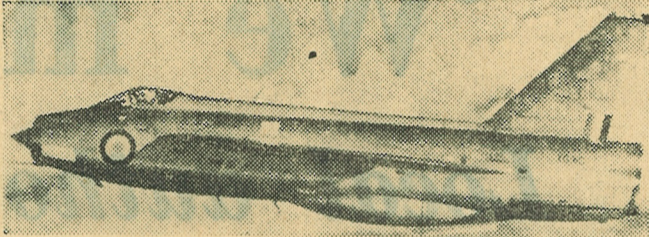
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Bang on! That's the

A BAC Lightning streaks through the sky at high speed. But down in Essex is "the factory" — an establishment which can simulate exactly the wave patterns of a Lightning's sonic boom. And that's not all they do down in Waltham Abbey...



price of progress

By KEN JOHNSON

THE picturesque village of Waltham Abbey in Essex abounds with history, pubs . . . and explosions.

There, King Harold — shot in the eye with an arrow at the Battle of Hastings — is said to be buried beneath the ancient abbey itself.

There, one of Guy Fawkes' conspirators is said to have bought gunpowder — though the first record of a gunpowder factory is 1662, 57 years after the gunpowder Plot.

Now the village frequently resounds with up-to-date explosions — from the muffled crunch of a military blast to the double bang of a simulated sonic boom.

The Ministry of Technology's Explosives Research and Development Establishment sprawls to north and south of the original gunpowder factory.

In the latter part of the 18th century, the government became dissatisfied with the quality of the factory's product.

And so in taking over the factory, it unwittingly created Britain's first real nationalised industry: Explosives.

It supplied gunpowder—a mixture of sulphur, sodium nitrate and charcoal—for the Crimean War.

It moved into the production of cordite—nitro-cellulose and nitro-glycerine—for the First World War, providing 200 tons a week at its peak.

And today, the villagers still refer to the site as "the factory" — though it was bombed in the winter of 1940/41.

It is now the site of the only Government laboratory for research and development of non-nuclear military explosives of every kind.

The 500-acre site, with its leafy wooded areas, its own canal and wild-life, has some 250 buildings which are the scene of many other interesting and sometimes commercial offshoots, in its scattered laboratories, test sheds, bunkers and ancient workshops. Government technicians and researchers today produce all kinds of interesting materials and gadgetry.

WIDE RANGE

These range from a fibrous material one quarter the weight of steel which will bear up to 150,000lb. per square inch, to an instant surfacing foam which can be sprayed on rough ground and is strong enough to land an aeroplane upon.

It is also concerned with the development of solid and liquid propellants, rubber products, sonic-boom-proof ear protectors, jungle boots, tank tracks, hovercraft "skirts" and advanced research into cooling systems, chemical analysis and engineering.

Its 1,000 personnel comprise university graduates, professionally qualified experts, specially trained explosives processors and skilled manual workers.

The special transistorised ear protector already mentioned was one of 12 items which were the subject of patent applications in the 12 months preceding July last year.

The gadget allows the

wearer to hear normal conversation — but cuts out at a level of sound which might be dangerous to the hearing.

ANSWER

It might be the only answer to sonic boom or loud aircraft noises.

It most certainly could be used by workers involved in blasting work — as well as the men involved in explosives research.

The fibres are separated and aligned in straight strands — then used to reinforce a resin mixture in the same way that steel bars are used to reinforce concrete.

The result is an extremely strong composite material.

Application of such a material still rather an expensive process—is obvious.

Such a material could be employed in aircraft construction — cutting down the weight and increasing the payload of aircraft.

In the polymeric materials field, the experts have developed the spray-on polyurethane foam already mentioned and have supplied Britain's military with all kinds of plastic and rubber goods such as tents, map cases, life rafts, tank tracks, inflatable rubber fuel and water storage and transportation tanks.

One futuristic commercial possibility of the polyurethane foam is as a solid filler for the walls of plastic, prefabricated houses.

On the military side again, the experts developed a rubber which conducts electricity — cutting down static electricity generated by rubber tank tracks which puts radio out of action.

The focal point of the establishment, not surprisingly, is its high energy explosives facility.

This consists of a reinforced explosion-proof block of chambers, bounded by ordinary "soft" built administration offices and laboratories.

The inner section can take explosions equivalent of up to 15 tons of TNT—enough

to demolish an average semi-detached house.

Larger explosions are carried out on a site beyond the block and its storage magazines.

The explosives are carried on a miniature electric railway, the charges are measured, set and detonated — all by remote control.

"We will risk equipment and occasionally a building, but we will not risk human lives," said Mr E. G. Whitbread, superintendent of explosions.

"We have to make explosives safe enough for a drunken sailor wearing boxing gloves so that there is absolutely no risk when they are finally handed over."

The department's work is so precise that it is possible to simulate the exact shock wave pattern of a sonic bang made by a BAC Lightning jet.

In the solid and liquid fuel propellant section, Dr W. G. Williams, one of two superintendents, explained:

ACCURACY

"We have to make propellants that will burn at a predetermined rate for an exact time with a standard thrust and which will retain all these characteristics for an indefinite period.

"Our fallibility risk has to be something in the region of one in 10,000—that's how accurate and precise our work must be."

It has also produced a 1½lb. cartridge case which disintegrates almost immediately on firing — thus dispensing with the old weighty and cumbersome spent metallic casings.

Another department — the heat transfer laboratories — has, under Mr Hans Ziebland, carried out studies on oils and chemicals under specially simulated conditions.

These then, are just a few of the diversified projects carried out at the little-publicised establishment that surrounds the unquiet village of Waltham Abbey.

Naturally, there are some complaints from the villagers about things that go bump in the day up at "the factory." But this is part of the price paid these days for advanced technological development.