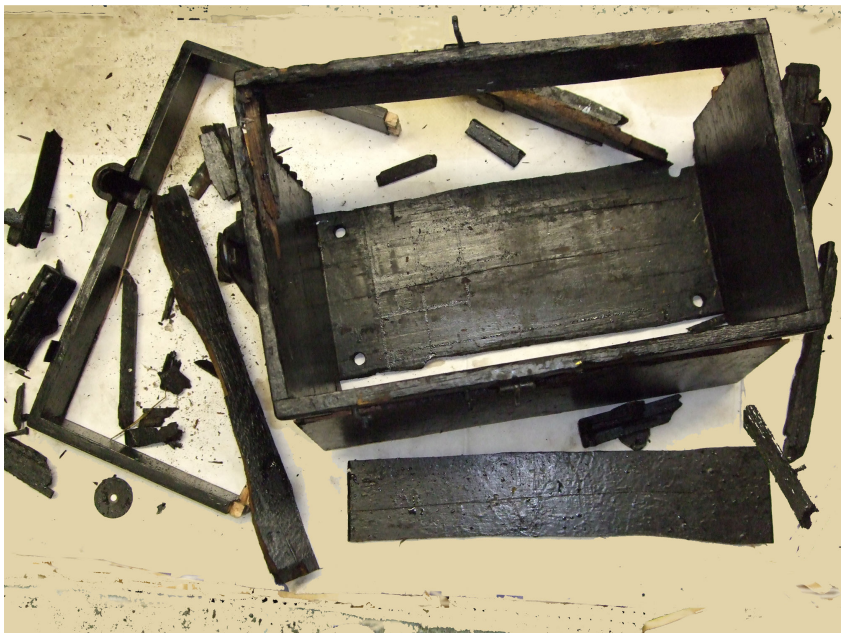
A 20hp Hydrogen Bomb

In 2009 a couple visited an historic house and garden with other members of the South Western Section. They got into their car to drive home, switched on the ignition, and … there was an almighty explosion immediately behind them. They were very shaken by the experience, but fortunately not injured. The shattered battery and its box were scattered on the road swimming in a puddle of sulphuric acid.



After other members helped to clear up the mess and retrieve the pieces, they managed to drive home on the magneto. They said it was lucky they were still using the original wooden box, as this had exploded sideways under the car. A steel box might have funnelled the explosion up behind the driver's seat. And it was also lucky there were no passengers in the rear seats. They used all the recovered metal fittings with new teak planks to make a replacement box.

They believe the explosion was inside the 10-year-old battery; it could have been caused by a build-up of hydrogen and oxygen gases under pressure. Perhaps when the starter switch was activated a small spark or a hot spot was generated within the battery which ignited the explosive mixture.

It was a sealed-for-life battery; this type is not recommended for older cars, ie cars without a modern regulator, where overcharging (gassing) can cause the build-up of an explosive mixture.

It is much safer to use a traditional battery fitted with plugs which allow gases to escape, and also encourages regular inspection and topping up with distilled water, as discussed in the following letter (the 20hp Instruction book recommends checking electrolyte level every 500 miles!).

Correct Choice of Battery

The following communication was provided by a retired professional electrical/electronic engineer. He emphasises that an "old fashioned" vented battery **must** be fitted to a 20hp car, and indeed to all pre-alternator cars that rely on a dynamo for charging.

Following the recent report of an unfortunate incident where the battery in a 20hp exploded, I feel some warning is needed as to the importance of choosing the right battery for your car, It is not sufficient to take the advice of the sales assistant in the local accessory shop or garage - you need to make this decision for yourself. Since the 1980s, fully-sealed or maintenance-free car batteries have been available and appear to offer several advantages over the traditional type of vented battery, in particular elimination of the tedious business of topping up the electrolyte. However, some fairly critical charging conditions need to be met to avoid damage to the battery, and with older cars this cannot always be achieved. Consequently, **I would recommend seeking out and fitting a traditional vented battery to any car fitted with a dynamo** (as opposed to an alternator). The visual difference between the two basic battery types is obvious in that the fully-sealed type has no filler plugs for topping up the electrolyte.

To go into the technicalities in more detail, a partially discharged lead-acid battery will accept several amps of charging current until it is fully charged. Beyond this point, the battery can absorb no further energy and the applied current results in electrolysis of the water content of the electrolyte, causing the familiar bubbling, emission of gasses and gradual lowering of the electrolyte level. Access to the cells in a traditional style of battery enables the water loss to be easily replenished, with no harm done. The introduction of electronically-controlled alternator systems in the 1960s enabled charging conditions to be much more closely controlled, eliminating the possibility of over-charging. The topping up facilities thus became redundant and the fully-sealed battery emerged as the modern version of the traditional car battery. Over-charging a fully-sealed battery is a risky business and needs to be avoided at all costs. The gasses produced are a dangerous

combination of oxygen and hydrogen, and pressure is liable to build up which can at worst cause an explosion, fortunately quite rare but by no means unknown. Some recent battery designs incorporate a safety valve, but any loss of water cannot be replenished and performance is bound to suffer sooner or later.

Up to the mid 1930s, vehicle charging systems were very basic, comprising a dynamo delivering a fixed current which could be switched on or off, or in some cases switched to one or two intermediate levels. In any case, it was up to the driver to estimate when the battery was fully charged, but this was not critical since any loss of water was easily replenished. In my opinion, any car coming into this category should not be fitted with a fully-sealed battery without running a real risk of problems.

From the mid 1930s, electro-mechanical voltage regulators were introduced which reduced the charging current when the battery voltage reached a level indicating a full charge, providing a good degree of automatic control, but not to the same precision as a modern alternator system. In pre-war cars, the regulator has its own housing on the bulkhead in addition to the fusebox, so it's easy to check which system you have. All pre-alternator post-war cars were fitted with voltage regulators. When new and properly set up, a voltage regulator should provide sufficient protection against over-charging. However, being mechanical and subject to wear, and liable to be neglected over the years, I would recommend that again the use of a fully-sealed battery should be avoided.

Finally, the same over-charging hazards apply when charging a fully-sealed battery with an external battery charger. It is essential to use an electronically-regulated charger made for the purpose. A traditional unregulated charger is not suitable, even if the battery is considerably discharged, and should not be used under any circumstances.