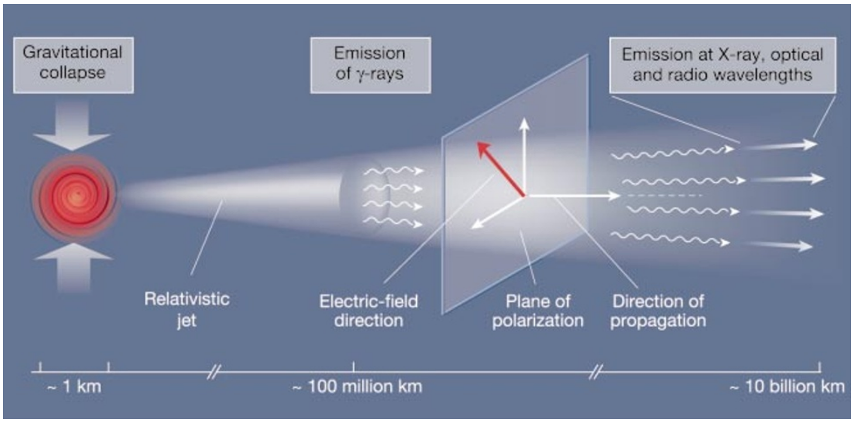

Figure 1 **The creation of a γ-ray burst (GRB). If a dying star a few times heavier than our Sun collapses to a diameter of just one kilometre, a large amount of gravitational energy is released as a black hole forms. The energy is carried away by a highly relativistic jet of material, propagating at nearly the speed of light and generating, from inside the jet, a short flash of γ-rays. The electric field associated with the propagating γ-rays lies in a perpendicular plane and may point in any direction within this 'plane of polarization'. Coburn and Boggs[2] have detected a specific orientation, or polarization, of the electric field that could be the consequence of a strong, constant and well-ordered magnetic field in the region surrounding the source of the GRB. Further from the source, the jet interacts with the surrounding medium, generating an afterglow of X-rays, optical and radio waves that lasts a few days or months.**

Strong polarization might also arise in a randomly oriented magnetic field — a structure that would be expected if the field is generated in the γ-ray production region — provided that the line-of-sight to the GRB lies close to the jet edge[5,6] (Fig. 2b). In this case, the polarization signal is not averaged out: radiation reaches the observer only from points lying to one side of the line-of-sight, closer to the jet centre; radiation from points on the other side, outside the jet cone, is 'missing'. For a highly relativistic jet, with a velocity that is 99.99% that of light, such an orientation is likely to occur by chance only if its opening angle is close to 0.01 radians (0.6 degrees); the closer the jet velocity is to the speed of light, the smaller the opening angle required. Afterglow observations suggest that jet opening angles are typically about 0.05 radians, with more powerful GRBs produced by narrower jets[7]. The burst reported by Coburn and Boggs[2] is exceptionally bright, and its jet may therefore have been very narrow. So the existence of a randomly oriented magnetic field cannot be discounted.

Both of these interpretations of the data pose challenges to models, which need to explain how a constant ordered field or a highly collimated jet might be produced. Future observations will determine which one is valid. ■

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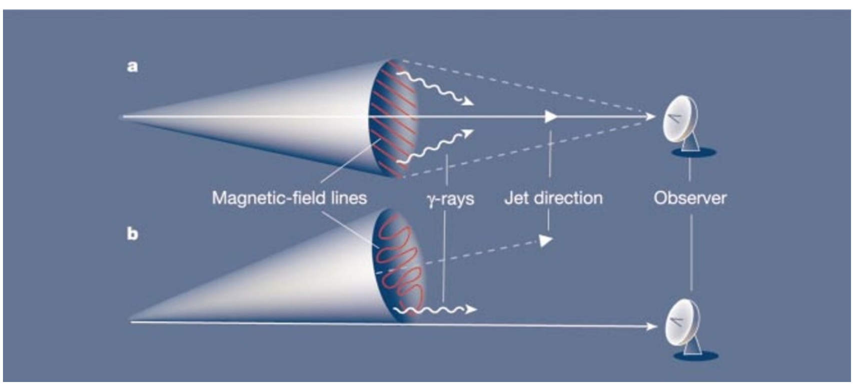

Figure 2 **Magnetic fields and polarization. Energetic electrons gyrating in a strong magnetic field inside the jet of material ejected by a collapsing star would emit polarized γ-rays. The strong degree of polarization seen by Coburn and Boggs[2] suggests that the magnetic field is ordered, provided that the observer's line-of-sight to the γ-ray burst (GRB) is close to the axis of the jet cone** (a)**. But if the line-of-sight to the GRB runs along the edge of the jet cone** (b)**, the same degree of polarization could be seen even if the magnetic field is oriented randomly.**

NATURE

100 YEARS AGO

We learn from the *Athenaeum* that a Norwegian expedition, commanded by Captain Roald Amundsen, left Christiania a few days ago with the object of fixing the exact situation of the magnetic North Pole. The party are expected to be absent for four years, the route taken being by Lancaster Sound, Boothia Felix, where a magnetic observatory will be established for a period of two years under control of two members of the scientific staff, and back by the North-West Passage, Victoria Land, and the Behring Straits.

ALSO...

A Paris correspondent states that on May 8, a balloon built for MM. Lebaudy made a notable performance. The balloon left the Moisson Aërodrome in the morning and returned to it after having navigated round Mantes at a distance of 10 kilometres… The length of the air-ship is 56 metres, and the volume 2300 cubic metres. The engine is a 40 horse-power. There were two persons on board, M. Juchmès, a well-known professional aëronaut, and a mechanician.

From *Nature* 21 May 1903.

50 YEARS AGO

Sometimes, after heavy and prolonged onshore storms, great masses of foam are drifted in from the sea on to local rocks and beaches. A curious feature of these lather-like masses is the way in which they persist for relatively long periods even when blown about by the wind. Ordinary lathers soon revert to their former unlathered state: but sea foams may persist for a day or more when the weather continues moist and stormy and no sun shines. It is possible that the foam is 'held' by the presence of some protein material, and Miss E. M. Moore suggests that this protein material might be found in the alginate products of sea-weeds. This, however, does not explain how the surface tension of sea-water could be so lowered that the whipping action of storm waves could create a frothy mass… A likely explanation of the phenomenon is that, during storms, large numbers of planktonic organisms are destroyed and broken up because of the battering they receive in choppy seas. The surface tension-lowering chemicals which are thus released into the sea-water would allow the waves to whip up a froth and, if there is also present enough protein matter released from the alginate, a foam with lasting qualities might result.

From *Nature* 23 May 1953.