

computer network on 29 August 1995. It has been edited for our purposes, with emphases as in the original. Geoff Beneze is described as a sailor, daddy, gunsmith, shootist [sic], online publisher and computer programmer. Thus does the Information Super-highway come to *Squadron Quarterly*. — Ed.

Malcolm Kinnaird writes —

While sailing *Catriona* to Tasmania for the Tall Ships Race in 1988, we were struck by lightning during a severe line squall south of Portland. The main shaft of lightning struck the water some 20 or 30 feet behind the vessel, but damage at the mast top showed that there had been some contact with the vessel.

The surge of current induced in the bus bars on *Catriona* was sufficient to vaporise all the fuses and destroy all electronics. As a consequence, we were without radio, navigational aids and voltage regulators on two generators. The shrouds were not earthed, but there was no damage to the vessel other than to the electrical system. As a precaution, I now carry a second HF radio on *Catriona*, which is completely isolated, so that it can be utilised in the event of another strike.

I subsequently earthed the shrouds to the keel, but I was concerned to find that this induced some galvanic action in the hull which stopped when I disconnected the lead. I am still pondering on the whole question, and have yet to reach a firm conclusion as to the right way to protect the vessel.

Malcolm sent a copy of a fascinating article by Lt Cdr The Hon TA Jocelyn RN, entitled 'Lightning Strike' in *Royal Naval Association Journal*, Spring 1988. Quite apart from issues of copyright, this is too long to be reproduced in full. There is a cross reference to an article by Andrew Bray in *Yachting Monthly* for June 1987: 72.

On 17 February 1987 *Nikaun*, a centreboard ketch, was anchored in a [northern] winter berth "at the head of Orhaniye Liman" with two anchors on chain and surrounded by steep mountains. Both anchor chains were electrically connected to the twin forestays. He was well prepared, but "I did not connect the mast feet to forward and aft earth plates, nor did I hang mooring springs on chains from the shrouds as I

have done in the past. ... after observing many electrical storms, I considered that if struck, the earth plates on their normal bolts would merely have been blown through the hull. ... Subsequent reflection has not changed that view."

"Sitting at the saloon table, ... I suddenly became aware of a sort of shut off." A woman on a neighbouring yacht described that *Nikaun* had her masts and rigging illuminated like the filament of a light bulb. The boat was filled with dust and smoke. "I was initially somewhat bemused, ... as though one were in the early stages of a general anaesthetic. I knew about things that were happening, knew what I should be doing, but it was impossible physically to take action. ... Eventually, armed with my firefighting breathing gear and BCF extinguishers I extinguished the fires. I am not at all sure that powder extinguishers would have done the job."

Water poured in through a hole in the hull where the log had been. Mast head fittings either disappeared or were destroyed. A spinnaker pole track was burnt; a mast light exploded; and 18 inches of spinnaker pole toggle wire completely disappeared, presumably vapourised. All electric and electronic systems were damaged or destroyed. The two items switched on (a fluorescent light and a CD player) exploded. The engine starter switch was blown in two; solenoids were burnt out; and all ferrous tools were heavily magnetised. All batteries were finished. Radios, radar, autopilot and Satnav were totally destroyed. "The back plate of the VHF was splattered with a clean print of its components."

The fact that some components were destroyed with apparently intact cable between them, "leads me to believe that we are not dealing with electrics as it is normally understood but with a different form of power. ... The burnt or badly damaged cables were easy to recognise, but the most extensive damage was very insidious: perhaps a 5 m cable in apparently perfect condition and in the middle a short section where it appeared that someone had taken a knife and just cut the insulation off one side. ... Some six months before I had religiously gone round all the equipment, providing them with manufacturer's specified earths. From a common point I took these to the after porous

earth plate. I remain to be convinced of the value of this exercise. ... [It] may well have exacerbated damage to all the equipment."

The conclusion is that, "I should try to keep lightning out of the boat. *Nikaun* will be fitted with an insulated lightning conductor on top of the main mast. This takes the form of a 16 mm diameter pointed conductor rod mounted on four stacks of insulators and standing about one foot higher than everything else. Clamped to this conductor is a 95 mm² (about 11.5 mm core diameter) insulated copper cable that runs down inside the mast, exiting above the foot. The deck gland is an upside down plastic skin fitting with the hose side on top and self-amalgamating tape to make a water-tight joint. This cable ends a metre below the deck to allow for the removal of the deck-stepped mast. It is joined by two cable clamps to a second cable that runs to a through hull keel bolt, on the outboard end of which is a 15 in x 15 in porous earth plate ("the largest I could lay my hands on"). This plate is bolted separately to the hull. "Great care has been taken throughout to prevent corrosion of the joints and chafe of the insulation of so heavy a cable. ... In addition, I

have fitted an additional battery isolation switch on the negative from the batteries to try to prevent a buildup of 'earth' potential from the boat herself." He quotes a Lloyd's brochure which recommends avoiding earthing equipment if possible; together with fitting lightning conductors of a 12 mm diameter copper spike connected via a 100 mm² copper cable to a 2 sq ft earthing plate.

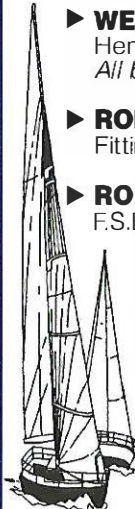
"My breathing gear is made up of 7 m of 1 1/4 in flexible light plastic tube. The mouth piece is made from bits of two snorkels (the type with a small non-return valve), which allows one to breathe in from the tube when one valve opens and out through the base when the first one shuts and the second one opens. One also needs a swimming mask. It works. It saved *Nikaun*."

[Mix of metric and Imperial measures as in the original]

John Moffatt of International Communication Systems Pty Ltd writes —

In July 1995 a customer with a multihull moored at the public marina, North Haven reported

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