evidently thought that they required notice. He has had them added to a figure of the plant which he reproduces from "Tabernæmontanus," as he explains, "with addition of the jointed tuberous roots as they are in Winter; yet by the Caruer's fault they are not altogether so exquisitely exprest as I intended." Withering ("Botanical Arrangement of British Plants," ed. ii., 1787, p. 613) has, "The roots, when dried and powdered, will make bread." And in Bromfield's "Flora Vectensis" (1856), the note occurs:—"The roots of *S. palustris* are said to become edible by cultivation. See Curtis, 'Brit. Entom.,' vi." This last is a book to which I have not convenient access; but the reference may give your correspondent a useful clue.

I may mention that I do not find the name "Bare Horehound" given at all in Britten and Holland's very comprehensive dictionary of English plant-names. The old name for *Stachys palustris* was "Clown's All-heal."

W. T. THISELTON DYER

Garfish

HAVING been absent from England for some time, I have only just noticed the two letters published in NATURE for July 5 and 12 (pp. 226 and 245), on "Garfish." I have little doubt that the fish described by Mr. S. Archer as having cut a slit in a felt hat was, as he believes, a garfish, a large Belone, not a Hemirhamphus, and not a swordfish or sawfish of any kind, as suggested by Mr. Goodsir. It is the constant habit of large Belones, some species of which attain, according to Dr. Günther, a length of five feet, when startled to move along the surface of the water by a series of rapid bounds for thirty or forty yards at a time, with astonishing rapidity. I have often seen them thus spring out of the water when scared by a boat. I was told that in some of the Pacific Islands these fish not uncommonly cause the death of the natives, who, when wading in the water, have their naked abdomens speared by the sharp snouts of the fish, with the result of causing peritonitis. The fish appear to bound blindly away from danger, and strike any obstacle in their way haphazard. As a good many natives wade in together in many of their fishing operations, as at Fiji, for example, where one party drives the fish into the nets held by another, such accidents may easily occur. I do not think a sawfish could possibly jump over a boat. I have described the jumping habits of the large garfish, and alluded to their fatal effects in "Notes by a Naturalist on the Challenger," p. 480.

H. N. MOSELEY

Continuous Registration of Temperature

IN your issue of July 26 (p. 306) there is a description of an apparatus lately devised by Messrs. Negretti and Zambra, by which a record of twelve temperatures in succession can be obtained by the somewhat elaborate arrangement of twelve thermometers, a clock, and a series of electromagnets and battery. I wish to bring under your notice a simple machine invented by Mr. Bowkett, late resident medical officer of the Leeds Fever Hospital, by which a continuous record of atmospheric temperature can be obtained by means of an apparatus consisting solely of a "bourdon" steam gauge tube, a clock, and a writing lever, costing little more than a few shillings.

Mr. Bowkett devoted great mechanical skill during several years of experimentation to the perfecting of a form of this instrument sufficiently small and accurate to be used for medical purposes, i.e. to register the temperature of the human body. For this purpose the instrument has to be somewhat more complicated, and accordingly more costly. Many of these are in use in our hospitals and elsewhere, and are of the greatest possible value.

These instruments can be made of any size, and when large are of very great strength, and might easily be applied for thermal regulation by attachment to valves or other ventilating arrangements. The instrument constructed by Mr. Bowkett for registering the temperature of rooms was of the size of a small clock, of the simplest possible character, requiring very little care in its use. Messrs. Salt of Birmingham are the licensees of the patent.

ERNEST M. JACOB

12, Park Street, Leeds

Aurora and Thunderstorm

A DISPLAY of aurora was seen here on the 30th ult., which may perhaps be of sufficient interest for insertion in NATURE.

A thunderstorm passed from west to south during the after-

noon. Thunder and lightning commenced between 3 and 4 p.m. and continued till about 9 o'clock. The storm centre was about two miles from the city; no rain fell here, though a heavy hail shower fell to the west in the afternoon. Lightning was vivid till past midnight in the south. From 11.30 to midnight an auroral light passed over the zenith from west to east, of well defined nebulous light. It was 10° in width as measured by a sextant. This was joined on the north by a horizontal band of aurora 18° altitude. There were no great flashing lights from this.

On the northern horizon was a small arc throwing up short flashes. The horizontal band was the brightest.

The temperature and force of wind and barometer readings were as under:—

	Barometer.	Wind.	Temperature.	
			Dry Bulb.	Wet Bulb.
3 p.m.,	29.857	...	79.8	71.9
6 "	29.855	...	71.4	64.0
9 "	29.862	S.S.E. 5 miles	66.4	64.0
12 "	29.851	S.S.E. 4 miles	60.9	60.3

Maximum shade reading of the day, 83° 5.
of the 31st, 82° 0.

The observatory is 764 feet above the sea level, and I am indebted to the observer for the above figures.

ALAN MACDOUGALL

Winnipeg, Manitoba, August 10

A Complete Solar Rainbow

ON Thursday, August 16, while R.M.S. *Norham Castle* was in lat. 2° 20' N., long. 13° 58' W., a phenomenon entirely new, at least to the officers and passengers on board, appeared at 11 a.m., and lasted until 12.30 p.m. This consisted of a complete rainbow round the sun, when nearly and at the zenith, having an inner diameter—taken by Capt. Winchester, R.N.R.—of 43° 08'. The day was bright and warm, with a slight haze above. The rainbow appeared to crown the whole of the upper dome of the sky, and to possess all the normal colours, only very slightly dimmed. Whether connected with this appearance or not I cannot say, but the next two days were squally, with heavy rains.

D. MORRIS

Kew, September 5

Animal Intelligence

I AM a constant reader of NATURE, and have read with much pleasure the several instances recently communicated by correspondents of animal intelligence, a subject in which I take great interest.

It has struck me that some of your readers might in turn be interested in hearing of the intelligence and powers of observation of a collie bitch called "Winifred," my constant companion.

In one of the fields attached to my house there is a large pond well stocked with fish, and especially with eels. I very often spend an evening fishing for these latter, using several lines at different points round the pond, the rods lying on the grass, each one receiving my attention whenever its respective float indicates that there is a bite.

The collie "Winifred" is constantly with me on these occasions, and has always taken the greatest interest in her master's proceedings, watching every movement most intently. It was for a long time a source of considerable amusement to me to notice that by constant observation the dog had come to understand the connection between the bobbing and final disappearance of a float and the subsequent exciting proceedings of pulling up an eel, disengaging it from the hook, and putting it into the creel. The cocked ears, head on one side, and eager eyes of "Winifred" when she saw a float bobbing gave plain proof that she was as much interested in the fishing as her master.

One evening some six weeks ago it happened that I was at one end of the pond baiting a hook, while the dog had remained at the other end, lying on the grass close to one of the rods. Suddenly I observed her showing signs of excitement, and, on looking across, saw one of my floats finally disappearing under the water. As I did not come, "Winifred" got very excited indeed, uttered one or two sharp yelps, and ended by seizing the rod in her mouth and "backing" with it, attempting to pull out the line from the water. I hurried to take the rod from her, fearing the effects on my tackle of the lack of skill of this canine

disciple of Izaak Walton! There was a goodly eel on the hook, sure enough.

Since then "Winifred" has once again attempted to pull out the line under exactly similar circumstances. Surely this conduct shows powers of observation and of inference of no mean order?

I may add that the collie is now three years old. She saw me fishing many times last summer, and, as I said before, always showed great interest in what was going on. But it was not till six weeks ago that I had any idea how much she was profiting by what she saw.

Perhaps some of your other readers who fish, and are accompanied by intelligent dogs, may have observed similar instances of reasoning power. Seeing to what perfection dogs can be trained to take part in other branches of sport, perhaps it is not very surprising that here and there one should show a little appreciation of the leading points of the "gentle art" of angling.

MORGAN J. ROBERTS

The Hollies, Cwm Newydd, Holywell,
North Wales, August 31

Copper and Cholera

NEED we go to Sweden to test the theory that copper is a preservative against cholera? The year before the 1865 epidemic I travelled by train past Swansea, and my attention was called to the utter want of verdure in the surrounding country, due, I was told, to the copper fumes.

Now, according to the official report, the deaths from cholera in Swansea were 88 in 10,000 in 1866, in Neath 79, in Llanelli, 76—all places in the same neighbourhood; thus showing a far greater mortality for the copper-smelting district than any other in England or Wales. The mortality for all England was only 13 in 10,000, and for London 18. The only two places which in any degree approach Swansea are West Ham with 50, and Liverpool with 54; in both of which it is well known cholera was especially severe. The epidemics of 1849 and 1854 present Swansea in a more favourable light.

Perhaps some of your Swansea readers, by giving the number of deaths—if any—among the actual workers in the metal, can help those who, like myself, are inclined to believe in copper as a prophylactic; in what way I scarcely know, unless it be according to the principles of homœopathy, as my experience on three occasions—and a lively time I had of it—lead me to believe that copper added to plums to preserve their colour should be eschewed, at any rate in cholera times.

Dulwich, September 1

B. G. JENKINS

The Meteor of August 19

THE same meteor was undoubtedly seen by Mr. Crispin at Wimbledon, Mr. Pooley at Cheltenham, and myself at Llandudno, and I think I can remove Mr. Crispin's difficulty.

The apparent fall of meteors towards the earth is generally an effect of perspective. An object at a great height moving directly away from the observer appears to move perpendicularly downwards. If moving away obliquely to right or left, it appears to have a more or less horizontal path with a downward inclination.

This meteor was evidently not moving towards the earth, but was one of those that skim the upper atmosphere, white-hot at their surfaces while the resistance is sufficient, and dark again as soon as they pass into a thinner medium. I suppose it to have first become luminous when directly over Essex, not far from Chelmsford, at a height of about seventy miles, passing north-east over the sea, and vanishing near the Texel. Its appearance along such a path would agree very fairly with the three observations, except that, if Mr. Pooley saw it first quite south-east by compass, it must have been luminous for a second or two before Mr. Crispin or myself observed it, and the starting-point would be nearly over London.

I was wrong at first in referring to the Yorkshire coast. The visible path was clearly south of the Humber.

ALBERT J. MOTT

Crickley Hill, Gloucester, September 2

THE ISCHIAN EARTHQUAKE OF JULY 28, 1883

SINCE my last letter to NATURE most of my time has been occupied in visiting different parts of the island, and although there are still a number of objects to be

carefully examined the general features of the catastrophe I hope to have cleared up.

The actual moment of the earthquake is unknown, but seems to have been about 9.25 p.m.; so, supposing the shock registered at Naples and Vesuvius to be identical with that of Casamicciola, had the observation of time at the latter locality been correct, we could calculate the velocity of transmission, but which it is to be feared is impossible.

As mentioned in NATURE, the shock was preceded by general seismic disturbances throughout Southern Europe. In the island itself we have the most contradictory statements as to premonitory signs and symptoms. One gentleman noticed on two occasions previously his watch, which was suspended by a nail to the wall, swing backwards and forwards. The assertion about the water at Gurgitella being much hotter some days before is of little value without proper thermometric observations, since it is known commonly to vary 20° C., and may reach more than 40° from time to time, and I am acquainted with a thermal spring at Bagnoli, near Naples, that varies 23° C., ranging from 13° to 36° C. Perhaps the most remarkable of these kinds of statements was couched in these words:—"The syndic of Serrara Fontana (a town on the south of the island) telegraphed to the Minister of Public Affairs to the effect that in that country a fissure one kilometre long, thirty metres broad, and of unknown depth, from which were issuing dense columns of vapour." On reading this I started immediately for Serrara, and there the syndic placed at my disposal his two informants as guides. After a climb of three hours and a half along the almost impassable sides of Epomeo, we came to its northern slope over Lacco Ameno, with the two landslips I had visited and photographed thirty-six hours after the shock. The fissures were such as take place along the edges of all landslips. No vapour was issuing, and its presence for a short time after the earthquake could be easily explained: the locality is part of the old fumarole area of Monte Cito, where alum was manufactured centuries ago; the rock is much decomposed by the continual escape of acid vapour, and only required the earthquake to shake it down; when the displacement took place a large surface of hot and moist tufa was exposed, and no doubt for some time gave off a quantity of vapour.

It will be seen that not a single point of the size, locality, and characters of the fissure described by the newspaper was correct or free from gross exaggeration. I have visited with care all similar sites of supposed fissures, but after some days of want of shelter, sleep, an abominable starvation diet of bad bread and rotten cheese, combined with continual climbing from daybreak to sunset in an extraordinarily hot Neapolitan summer in the hope of finding some evidence of volcanic action, I did not meet with the slightest success. I was accompanied in these excursions by my friend, Prof. P. Franco of Naples, who shared my disappointment and disgust. Holding as I do the volcanic nature of the earthquake, the appearance of any such phenomena would have been greedily accepted.

If we draw isoseismal lines over the injured districts, we find that they assume the form of elongated ellipsoids whose major axes run nearly east and west.

The fourth isoseismal area, in which houses are only very slightly fissured, not only includes the whole island but must extend into the sea some distance.

One remarkable fact is the manner in which the houses of the marinas have suffered much less than others in their immediate neighbourhood, or even farther away from the seismic vertical. This is no doubt due to their foundation reposing on sea sand, which, from the looseness of its particles and therefore inelastic nature, acted as a mattress and absorbed the earth waves. The same fact is observable in all buildings that have their founda-