

Mr. Forbes exactly gives the difference, as thinner, more wiry, and high pitched; it is also shorter, at least in the wild *G. ferrugina*. These I have often heard crowing, and shot in the extreme east of Asam, where for a very large area, on the Upper Diking River, and across Patkai, there are no inhabitants.

This same *G. ferrugina* is, however, to be found wild all over Asam, and the countries around; eggs found in the jungles are often hatched under domestic fowls, and hence these are frequently crossed, and the crow of the cock varies much in consequence.

But the difference between the wild *G. ferrugina* and our "barn-door" cock, in this particular, is so well marked that it could *invariably* be detected.

I may perhaps mention a curious sight I saw last year, within 100 yards of my bungalow, in the evening. A cloud of white ants were rising on the air, in the main road, and a jackal and jungle cock were busy eating the "neuters" swarming all over the ground; presently another jackal joined and the cock was between them: all were so busy feeding that they took no notice of each other, the jackals often lying on their bellies, while the cock moved about between them, at 2 or 3 yards only. By this time 15 or 20 people were looking on and laughing. Suddenly a third, younger jackal, joined the group, and after eating the ants a short time, and walking about like the others, dropped into the ditch and stalked the cock, crouching close to him. The latter at once flew, and made a bee line for the forest 400 yards off. The total area of the ants was about 20 feet by 8 only.

S. E. PEAL.

Sibsagar, Asam, March 27.

#### Antipathy [?] of Birds for Colour.

WITH regard to the destruction of the yellow crocus by the sparrow, mentioned by your correspondent "M. H. M." in NATURE, vol. xliii. p. 558, this bird appears to have a predilection for yellow. In an article on "Birds' Nests and Nest-building," in the *Animal World*, present number, an instance is given of sparrows using the flowers of the laburnum for their nest. Only lately I have been watching them picking out the yellow centres of the daisy, but in this case *it was for food*, and I am inclined to believe that some portion of the crocus is also eaten. At this time of the year they are well known to be partial to buds and flowers of different kinds—for instance, the blossoms of the gooseberry bushes.

Doubtless, the bright yellow colour attracts the attention of this now much censured bird, so omnivorous in his tastes and such a general scavenger, and therefore not wholly to be condemned.

Clevedon, April 28.

T. B. J.

#### The Destruction of Fish by Frost.

REFERRING to Prof. Bonney's letter in NATURE, vol. xliii. p. 295, regarding the destruction of fish by frost, and in which he asks for information from more northern latitudes, I may say that during the winter of 1885-86, at Cape Prince of Wales, Hudson's Strait, when the thickness of ice in a small lake was being measured, live fish were often seen; and upon the last occasion, when the ice measured six feet and half an inch, several were thrown up with the water that, upon our cutting through, immediately overflowed. These fish were about an inch and a half in length and were extremely lively. I may add that during the summer both feeder and outlet of the lake averaged about eight inches in depth and the lake nine feet in its deepest part. The former ceased to flow on November 8, when, too, ice, fourteen inches in thickness, covered the lake.

F. F. PAYNE.

Meteorological Service of Canada,  
Toronto, April 16.

#### The Flying to Pieces of a Whirling Ring.

WITH reference to the recent discussion in your columns on the whirling of steel bands, the following results will be of interest.

A weldless steel flask, with spherical body 12 inches in diameter and  $\frac{3}{8}$  inch thick, constructed for use in a centrifugal milk separator, to revolve about its axis of symmetry at a normal speed of 7000 revolutions per minute, was whirled at a gradually increasing speed, with a view to ascertaining the "bursting" velocity.

At 16,000 revolutions per minute the body of the flask had

bulged 2 inches in diameter: this is equivalent to an extension of 17 per cent. of the circumference; the peripheral speed being 840 feet per second, and the tension 31.5 tons per square inch.

The experiment was not continued, as it was considered sufficiently satisfactory, and the bulged flask is kept as a curiosity.

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#### HERTZ'S EXPERIMENTS.<sup>1</sup>

##### III.

IN the last article the principles upon which a rapidly vibrating electric oscillator should be constructed were considered, and how the sudden break-down of the air gap enabled these rapid vibrations to be started. It is probable that this break-down occurs in a time smaller than the thousand millionth of a second. How very rapid interatomic motions must be!

Consider now the principles on which an apparatus is to be constructed to receive the vibrations produced by this oscillator. We may observe in the first place that as we are dealing with a succession of impulses at equal intervals of time we can utilize resonance to accumulate the effect of a single impulse. Resonance is used in an immense variety of circumstances to accumulate the effect of a series of impulses, and is avoided in another immense variety of circumstances to prevent accumulating the effect of a series of impulses. We see, we hear, we photograph by using it; we use it to make musical sounds, to keep clocks and watches going, to work telegraphs. By avoiding it carriages drive safely over rough roads, ships navigate the seas, the tides do not now overwhelm the land, the earth and planets preserve their courses round the sun, and the solar system is saved from destruction. Resonance may be thus described:—If a system is able to vibrate by itself in any way, and if we give it a series of impulses, each tending to increase the vibration, the effect will be cumulative, and the vibration will increase. To do this the impulses must be well timed, at intervals the same as the period of vibration of the system itself. Otherwise some of the impulses will tend to stop the vibration, and only some to increase it, and on the whole the effect will be small. In order to use resonance in the construction of the detector of waves of electric force, we must make our detector so as to be capable of an electric vibration of the same period as the generator of the waves. If we do this we may expect the currents produced in it to be increased by each wave, and thus the electrification at its ends to increase, and so increase the chance of our being able to produce a visible spark. Two ways of using a detector have been mentioned. One is to observe the heating of a conductor by the current in it, and the other to observe a spark due to the electrification at the end of the conductor. The latter is the most sensitive and has been most frequently employed, and is the method first employed by Hertz. Two forms of detector may be used for observing sparks. One form consists of a single conductor bent into a circle with its two extremities very close together. An electric charge can oscillate from one end of this to the other round the circle and back again. If the circle be the proper size, about 70 cm. in diameter for the large sized oscillator and about 8 cm. in diameter for the smaller sized one described in the last article, the period of oscillation of this charge will be the same as that of the charge on the generator of the waves, and its oscillation will be increased by resonance until, if the ends of the circular wire be close enough together, the opposite electrification of the ends will become great enough to cause a spark across the gap. The other form of detector depends on using two conductors, each of which has the same period of electric oscillation as the oscillations we wish to detect. These

<sup>1</sup> Continued from p. 14.