The Chairman proposed the re-election for a further year of Mr. P. Tate as Hon. Treasurer, and Mr. M. W. Woodcock as Hon. Secretary, and the motion was seconded by Sir Thomas Barlow and carried unanimously.

Mr. P. Tate proposed a vote of thanks to the Auditors, which was seconded by Mr. D. Calder.

Mr. P. Tate also proposed a hearty vote of thanks to Mr. N. J. P. Wadley for his success in selling back numbers of the *Bulletin* to the Club's great benefit, and the motion was seconded by Mr. Philip Wayre.

Dr. W. R. P. Bourne proposed that the *Bulletin* should be published less frequently, and the various merits and demerits of the scheme were discussed. Sir Hugh Elliott suggested that the matter should be given further consideration by the Committee, and this was agreed.

The Chairman declared the Meeting closed at 7.25 p.m.

Plant poisons in the diet of wild birds

by JANET KEAR

Received 14th March, 1968

In general, little account seems to be taken in avian pathology of the resistance of wild birds to poisons occurring naturally in their plant food. The attention of the Wildfowl Trust was drawn to the matter when it was pointed out that if livestock ate the quantities of green, rotten and sprouting potatoes consumed each winter by waterfowl, they would soon show symptoms of solanine posioning. The observation that birds do take 'poisonous' food, particularly berries, is commonplace, but the implications are seldom considered. This short note does not seek to establish the physiological basis of the immunities birds must possess, interesting though this will be. As an initial step, it merely tabulates examples of European birds making meals of vegetable material known to cause illness or death in man and his domestic animals. The name of the toxin is given where it is known; many are alkaloids, defined as relatively complex, basic substances, occurring as products of plant metabolism and causing physiological reaction in animals (Henry 1939). Information on the plants was abstracted from Forsyth (1954) and on the birds from various ornithological sources.

TABLE

Plant species	Toxin	Bird species
Traveller's Joy *Clematis vitalba*	protoanemonin	buds taken by Bullfinch (Jourdain 1938; Newton 1959).
Anemone *Anemone nemorosa*	,,	buds, leaves and rootstocks by Pheasant (Hammer *et al.* 1958).
Lesser Celandine *Ranunculus ficaria*	,,	bulbils by Pochard, Mallard, Tufted Duck, Goldeneye (Campbell 1947); tubers by Partridge, Pheasant (Grimshaw 1912; Hammer *et al.*); leaves by Pigeon, Barnacle Goose, (Campbell 1946; Collinge 1913).
Crowfoot *R. sceleratus*	,,	leaves by Coot (Collinge 1924), whole plant by Wigeon and Pochard (Olney 1964).
Buttercup *R. acris*	,,	buds and leaves by Black Grouse, Partridge, Red-legged Partridge (Hammer *et al.* Campbell; Middleton and Chitty 1937).

Plant species	Toxin	Bird species
Bulbous Buttercup *R. bulbosus*	protoanemonin	roots by Partridge (Jourdain); leaves by Pheasant (Grimshaw); corms by Wood Pigeon (Campbell W. D. 1965).
Poppy *Papaver rhoeas*	rhoeadine	young leaves by Skylark (Mountfort 1950), buds and flowers by Partridge (Middleton and Chitty).
Spindle *Euonymus europaeus*	euonymine?	red berries by Magpie, Nuthatch, Pheasant Great Tit, Blue Tit, Marsh Tit, Long-tailed Tit, Blackbird, Robin, Hawfinch (Turcek, 1954; Hartley, 1954; Gibb, 1954; White, 1789; Mountfort, 1957); buds by Bullfinch (Newton).
Buckthorn *Rhamnus catharticus*	emodin	black berries by Nuthatch, Blackbird, Robin Warblers, Tits, Golden Plover, Hawfinch (Turcek, 1948; Jourdain; Mountfort).
Laburnum *Laburnum anagyroides*	cytisine	seeds by Hawfinch, Bullfinch, (Mountfort; Newton).
Broom *Sarothamnus scoparius*	,,	seeds by Hawfinch (Mountfort); buds by Bullfinch (Newton).
Bryony *Bryonia dioica*	bryonin	red berries by Blackbird, Starling (Hartley 1954; Havlín and Folk, 1965).
Hemlock *Conium maculatum*	coniine	seeds by Quail (Sergeant, 1948).
Cowbane *Cicuta virosa*	cicutoxin	seeds by wildfowl.
Ivy *Hedera helix*	?	black berries by *Turdus* species, Hawfinch, Robin, Garden Warbler, Blackcap, Corn Bunting, Moorhen, Pigeon (Hartley; Jourdain; Collinge, 1913; Mountfort).
Privet *Ligustrum vulgare*	ligustrin	black berries by Blackbird, Robin, Waxwing, Bullfinch, Blackcap, Garden Warbler, Pheasant, Starling, (Hartley; Jourdain; Newton; Gibb; Szijj 1956–57; Turcek).
Woody Nightshade *Solanum dulcamara*	solanine	red berries by Cirl Bunting, Hedge Sparrow, Golden Plover (Jourdain).
Black Nightshade *S. nigrum*	,,	black berries by Partridge, Starling (Vertse *et al.* 1955; Havlín and Folk).
Potato *S. tuberosum*	,,	tops by Black Grouse (Jourdain); green, sprouting and rotten tubers by Mallard, Greylag, Pink-footed Goose, Swans (Kear 1963).
Sorrel *Rumex acetosa* *R. acetosella*	oxalates	leaves and flower shoots by Barnacle Goose, Black Grouse (Campbell, 1936; Jourdain; Hammer *et al.*).
Daphne *Daphne mezereum*	mezerinic acid	red berries by Pheasant, Hawfinch, Greenfinch, Blue Tit, Blackcap, Lesser Whitethroat, Robin (Aplin, 1910; Jourdain; Campbell, W. D.) green (unripe) berries by Greenfinch (Pettersson, 1956).
Spurge Laurel *D. laureola*	,,	black berries by Hawfinch (Mountfort).
Sun Spurge *Euphorbia helioscopia*	euphorbiosteroid	seeds by Tree Sparrow, Partridge (Hammer 1948; Vertse *et al.*).
Dwarf Spurge *E. exigua*	,,	fruits by Stockdove (Murton, *et al.* 1964).

Plant Species	Toxin	Bird species
Oak *Quercus* sp.	tannic acid	acorns by Mallard, Pheasant, Pigeon, Jay, Starling, Magpie, Rook (Olney; Jourdain; Collinge).
Juniper *Juniper communis*	?	black berries eaten by *Turdus* sp. and finches (Jourdain); shoots by Black Grouse (Hammer *et. al.*).
Yew *Taxus baccata*	taxine	red berries by Spotted Flycatcher, *Turdus* sp., Bullfinch, Starling, Waxwing, Moorhen, Pigeon, Greenfinch, Jay, Robin, House Sparrow, *Parus* spp., Blackcap (Hartley; Jourdain; Turcek; Campbell, W. D.; Olney, 1966) kernels by Hawfinch, Nuthatch, Great Tit (Mountfort; Jourdain); shoots by Hawfinch (Mountfort).
Lords and Ladies *Arum maculatum*	?	red berries by Willow Warbler, Whitethroat (Lancum, pers. com.); corm possibly by Blackbird (Campbell, W. D.).
Horsetail *Equisetum* sp.	palustrine & thiaminase	young plants by Greylag Goose, Pink-footed Goose (Campbell 1947; Sladen 1960).
Bracken *Pteridium aquilinum*	thiaminase	shoots by Capercaillie (Jourdain).

In addition to examples cited in the Table, birds take the dried seeds of certain poisonous plants, such as the red fruits of *Iris foetidissima* and seeds of *Chenopodium album*, *Polygonum hydropiper* and *Ranunculus* species, but probably little toxin occurs in the part consumed and thus their immunity is not in question. Even in the cases given, dosage may be small if the foods are taken irregularly. Further, many succulent fruits contain hard seeds that pass through the bird's gut without digestion or are ejected by regurgitation, and here the toxin is often present in greatest quantity within the kernel; this is true, for instance, of Yew berries, the flesh of which is taken by many avian species. But sometimes large doses are tolerated; Mountfort (1957) describes Hawfinches repeatedly cracking Yew seeds for the kernel, even collecting the seeds cast up by other berry-eating birds, and yet the alkaloid taxine, contained in the endocarp, is said to cause sudden death through cessation of heart action in 'all animals' (Forsyth 1954). The diet of this finch contains no fewer than six items harmful to many mammals. As another dramatic example, Kalmbach (1943) found that gallinaceous birds were immune to strychnine, the powerful alkaloid extracted from the seeds of an Asiatic tree *Strychnos nux-vomica*.

It is not suggested, of course, that any immunity is widespread among birds; what is agreeable to the Quail could prove fatal to the Budgerigar, and some plants are well known to cause trouble to the domestic fowl. Cuckoos may be the only species resistant to the strongly irritant substances (found to be histamines (Frazer 1965)) in the bodies and larval hairs of certain Lepidoptera. Vultures are unusual in tolerating putrid carrion that would poison most vertebrates by bacilliary action. Unlike other birds, they whitewash their legs and feet with faecal matter, suggesting the presence of a protective antiseptic in the gut. It may be that, as with tolerance to salt (Tordoff 1954), immunity to specific toxins "runs in families" and will be, therefore, of considerable interest in avian taxonomy. Mammals themselves are known to differ in their reactions to certain posions; acorns are taken by pigs but cause trouble to sheep and cattle,

and the rabbit appears to possess remarkable powers of detoxifying many alkaloids, in particular those found in *Atropa* and related species.

There are a number of plants bearing poisonous berries which, in the botanical sense, are assumed to be bird-dispersed, yet there seem to be few, if any, records of birds actually eating them. These include the black berries of Deadly Nightshade *Atropa belladonna*, Baneberry *Actaea spicata*, Cherry Laurel *Prunus laurocerasus* and Herb Paris *Paris quadrifolia*, and the red berries of Black Bryony *Tamus communis* and Lily of the Valley *Convallaria majalis*. Perhaps these plants are at the edge of their range in Britain and could be found to be bird-dispersed elsewhere. But one wonders whether a common hedgerow fruit such as Bryony, so often left to rot, could be unpalatable, although this explanation calls in doubt the whole evolutionary process of berry development. Turcek (1963) certainly found that some plant species were greatly preferred by a wide variety of European fruit-eating birds and so were more efficiently dispersed by them than others, and Olney (1966) has found similar preferences in British garden birds. Much remains to be learnt about the properties determining selective value of food objects. Could a conspicuous berry carry what was in effect a warning coloration to birds, just as certain unpalatable and dangerous insects do?

It is comforting to find few references in the literature to indirect human poisoning caused by eating wild birds with a catholic diet. The flesh of Quail that had fed apparently on Hemlock seeds, and thus taken the same toxic alkaloid that killed Socrates, caused illness among people in Algeria (Bicknell 1960), and Hazel Hens that ate *Kalmia latifolia* are said to have poisoned humans who later ate the meat. Much might be learnt from the chemical background to these cases, implying as they do, the direct transfer of toxins from the bird's gut to its muscles.

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A new species of warbler from the Aldabra Atoll

by C. W. Benson and M. J. Penny

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Introduction: The form of warbler here to be described as new to science was discovered during the current Royal Society Aldabra Expedition, which started in August 1967, the first specimen being taken by Penny. Any localities mentioned from the Aldabra Atoll, which lies in the western Indian Ocean at 9° 24′ S., 46° 20′ E., may be found on the maps (figures 3 and 4) in Stoddart and Wright (1967). This warbler seems so well differentiated as to merit description as a full species rather than as a subspecies of *Nesillas typica* (Hartlaub), of Malagasy (formerly Madagascar) and the Comoro Islands. It and *Dicrurus aldabranus* Ridgway are the only two land birds endemic to the atoll to have become differentiated to this degree. We name this form:

Nesillas aldabranus, *sp. nov.*

Description: The following is a brief diagnosis: A dingy coloured species, brown above, lacking any rufous tones as in *N. typica* or olive as in *N. mariae* Benson, endemic to Moheli, Comoro Islands; white below, lacking any yellowish, buffy or dusky tones, or well defined dusky streaking on the chest. In general colour, nearest to *N. t. lantzii* (Grandidier), of south-western Malagasy, but much darker brown above. A long-billed and long-tailed species, see under *Further systematic remarks* below.

A detailed description of the type, with code-references to the colour-chart of Villalobos-Dominguez and Villalobos (1947: tint OOS) is as follows: Mantle and scapulars dull brown (9 3°), somewhat more greyish