and a comparative analysis of frass and wood carried out. The result is expressed in the accompanying table (numbers being percentages of dry weight of material):

Insect	Sample	Total N	Non-protein N	Protein N	Protein
Hylesinus fraxini Panz.	ash bark	0·54	0·08	0·46	2·88
	frass of larva	0·41	0·182	0·288	1·43
	frass of adult	0·68	0·326	0·354	2·21
Lyctus sp.	English oak sapwood	0·207	neglig.	0·207	1·30
	frass of larva	0·176	0·149	0·027	0·169
Anobium punctatum Geer.	Oak(?) heartwood	0·51	0·237	0·273	1·70
	frass of larva	0·345	0·170	0·175	1·09

The assimilation of nitrogen is really greater than appears here, as a considerable loss of weight occurs during the passage of material through the insect gut.

The frass of the *Hylesinus* larvæ consists of particles about the size of sand grains, and it is very probable that the gastric juices have thus no access to a large part of the protein, and so leave it unchanged. This applies to an even greater extent to the frass of the adult, which is much coarser, and only part of which passes through the gut at all. The rest, falling from the mouthparts, is, of course, altogether unattacked by gastric juices.

It is particularly interesting that the frass of the adult contains more nitrogen than the unattacked bark. The adult is therefore continuously decreasing its nitrogenous substance. This follows from the fact that the loss of weight by the conversion of wood into frass is very low and the increase of non-protein nitrogen is very large. This result is surprising in view of the fact that I found in the *Hylesinus* imago quite a strong trypsin and erepsin.

The *Lyctus* frass is exceedingly fine, and it is therefore not surprising that the protein is almost entirely broken down while passing through the gut.

In the case of the wood sample infested by *Anobium*, the high percentage of non-protein nitrogen is surprising. The reason for this is not known, but it can scarcely be connected with natural growth. Why such a high percentage of the protein remains here unattacked I cannot say, but I suspect that not all the chewed up material actually passes through the gut. Nothing is known about the presence and strength of proteolytic enzymes in this case.

Each of the values above is an average from a series of estimations. The numbers must still be regarded with reserve, as there is a considerable fluctuation in the different stages of the life-history, a question demanding further investigation.

I have also examined a sample taken from a deal chest, probably wood of *Abies* sp., infested by the Cerambycid *Hylotrupes bajulus* L. I had too little material to give definite results, but it seems that the original protein content of the wood is in the neighbourhood of 1·28 per cent, and that about 25 per cent of the nitrogen has disappeared in the frass.

The nature of the nitrogen compounds excreted seems to offer a wide scope for further investigations. Only in *Anobium* does uric acid play the main part. Though this compound is also present in the others, it does not account for all the protein broken down. In *Hylesinus*, a considerable amount of ammonia was found in the excretions, which has possibly been derived from uric acid by bacterial action. On the whole, the problem of excretion in the wood-feeding insects remains still entirely unsolved.

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[1] Ripper, *Z. vergl. Physiol.*, 13 (1930).
[2] Mansour and Mansour-Bek, *Biol. Rev.*, 9 (1934).
[3] Parkin, *Ann. App. Biol.*, 23 (1936).

Jan Swammerdam

SINCE writing the sketch of Swammerdam which appeared in NATURE of February 6, p. 218, I have received some notes on the Dutch naturalist from that learned enthusiast Dr. H. Engel, of Amsterdam, which I hope he will publish in full in his forthcoming paper on the same subject. When I wrote my own contribution, I had not succeeded in obtaining a copy of the oration delivered by Prof. B. J. Stokvis at the celebration of the bicentenary of the death of Swammerdam held at Amsterdam in 1880. From this publication, and from Dr. Engel, I now learn that Swammerdam's grandfather was Jacob Dirksz. (= Jacob the son of Dirk, *ang.* Theodore or Richard), who was a wood merchant living in the village of Swammerdam, and it was he who migrated to Amsterdam and there adopted the name by which the great naturalist is known. Swammerdam's father, the apothecary, was therefore Jan or Johan Jacobsz. (= Jan the son of Jacob), and Swammerdam himself was baptized at the Oude Walenkerk of Amsterdam on Sunday, February 15, 1637, as Jan the son of Jan Jacobsz. Swammerdam and Baerta Jans Corvers. According to Harting, as quoted by Stokvis, Swammerdam's scientific career extended over twelve years only, from 1663 until 1675. It is improbable that he ever practised medicine. When he died, he was nearly forgotten, and it was the "magician" Boerhaave who brought to light his lost MSS. which gave immortality to the "sleeping beauty".

The statement so often made that Swammerdam's emotional obsessions were due to the influence of Anthoinette Bourignon seems to be an exaggeration. His friendship with her was the result, and not the occasion, of his deep interest in religion. The Dutch edition of the "Ephemeri Vita" testifies to his own innate and meticulous piety. Never was a sermon more deeply underlined or more laboriously justified. A scriptural basis for almost every word proclaims at once a profound knowledge of the Bible and an ingenuous belief in the literal interpretation of isolated texts.

Dr. Engel has found in Amsterdam an edition of the "Ephemeri Vita" published in Utrecht in 1699, a copy of which apparently does not exist in England. I also learn from him that the house where Swammerdam worked is still standing, and may be identified by a tablet erected during the celebrations of 1880. It remained in the possession of the family until 1716.

The decennial 'Swammerdam Medaille', also instituted in 1880, has been awarded to Siebold (1880), Haeckel (1890), Gegenbaur (1900), de Vries (1910), Max Weber (1920) and Spemann (1930).

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