from the early 1950s, especially on dispersal studies in insects[15,16]. Nor is the idea moribund today[2-4] and Itō and Iwasa[17] suggest that some valuable criticisms of western theories in ecology may be gleaned from Imanishi.

Imanishi's species-society concept, for which he coined the term *specia*[7,18] is also important. *Specia* is not the equivalent of a biological species but is a sociological concept that implies a system consisting of member individuals which support it through their interactions[18,19]. Its influence is most clearly seen in Japanese primatology. Based on the *specia* concept, the study of diachronic and synchronic aspects of social groups and individual life histories of primates, and the focus of social structure and its evolution rather than mechanisms by which individual behaviours are determined[20], coupled with Imanishi's advocation of more analogy with human behaviour[12,18-20], led to several differences between Japanese and Western research on primates.

Halstead believes that due to a "virtual absence of debate or intellectual confrontation"[1] in Japan there has been almost no response to Imanishi's evolution theory. In fact, the majority of Japanese scientists simply disagree with his recent popularizations and find these views obscure and untestable. Their silence is hardly surprising. A parallel situation existed in the West in that until the Creationist lobby appeared to be a real threat to freedom of scientific instruction in schools[21] scientists ignored their anti-evolutionary polemics as being unscientific and not worth commenting on. Instead, Imanishi is widely recognized in Japan for his innovative ideas and pioneering achievements in both biological and social anthropology. He initiated primate behaviour studies in Japan and headed the first African primate expedition. He pioneered research on hunter-gatherer and nomadic pastoralists in East Africa. Many social anthropologists and primatologists have been trained through projects initiated by Imanishi[22]. Several former students are active in top positions in ethnology, ecology, anthropology and primatology throughout Japan. Some of the unique contributions they have made took root under Imanishi's early influence.

As for Imanishi's evolutionary theory, Halstead's criticism of the culture in which it is embedded is as apparent in his book[23] as in his article[1]. His book does not enlarge on a systematic criticism of Imanishi's theory; more simply, it is a diary of his short sojourn in Japan.

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1. Halstead, B. *Nature* **317**, 587–589 (1985).
2. Sibatani, A. *Nature* **320**, 492 (1986).
3. Sinclair, M. *Nature* **320**, 580 (1986).
4. Millar, C.D., Phillips, N.R. & Lambert, D.M. *Nature* **321**, 475 (1986).
5. Nakahara, H., Sagawa, T. & Fuke, T. *Nature* **321**, 475 (1986).
6. Sibatani, A. *Kinji Imanishi and his anti-selectionism* (Paper presented at the Darwin Conference, London, 5 July, 1982).
7. Sibatani, A. *Rivista di Biologia* **76**, (1), 25–52 (1983).
8. Sibatani, A. *J. Social Biol. Struct.* **6**, 335–343 (1983).
9. Morse, E.S. *Japan Day by Day* (Kobunsha, Tokyo, 1936).
10. Tachibana, S. *Seibutsu-Shigen (Ichimei Shugenron)* (Keizai-zasshi-sha, Tokyo, 1896).
11. Ōsugi, S. *Shu no kigen* (Shinchō-sha, Tokyo, 1914).
12. Imanishi, K. *Seibutsu no Sekai* (Kōbunndo, Tokyo, 1941); *Seibutsu Shakai no Ronri* (Mainichi Shimbunsha, Tokyo, 1949).
13. Takasaki, H. *Seibutsu Kagaku* **36(2)**, 94–98 (1984).
14. Suzuki, A. in *Nijusseiki shizen kagakushi* (20th century). (ed. Makoto, N.). (Sanseido, Tokyo, 1983). (In Japanese).
15. Solomon, M.E. *A. Rev. Ent.* **2**, 121–142 (1957).
16. Itō, Y. *Kotaigun Seitaigaku no kenkyū* (Research on Population Ecology) **1**, 36–48 (1952) (In Japanese with Eng. summary); *Bull. natl. Inst. agric. Sci. Ser. C.* **11**, 45–130 (1960).
17. Itō, Y. & Iwasa, Y. *Res. on pop. Ecol.* **23(2)**, 344–359 (1981).
18. Imanishi, K. *Shizen* **12(2)**, 1–9 (1957).
19. Asquith, P. *Proc. tenth Cong. Int. Primatol. Soc.* **3**, (1986); *Shilsō* **717**, 36–51 (1984).
20. Itani, J. *Man* **20(4)**, 593–611 (1985).
21. Richard, A.F. *Amer. Anthrop.* **83**, 517–533 (1981).
22. Umesao, T. *Senri ethnol. Studies* **3**, iii–ix (1979).
23. Halstead, B. *Kinji Imanishi — The View from the Mountain Top: A Critique of Imanishi's Theory of Evolution.* (Tsukiji Shokan, Tokyo, in the press). (In Japanese).

The northerly extent of Chernobyl contamination

SIR—The radioactivity of snow collected in May 1986 in Svalbard and in Greenland clearly showed contamination of extreme north latitude locations by the Chernobyl accident. Suitably large (several kg) snow samples were subjected to gamma spectrometry, smaller samples were measured by global beta radioactivity (Table 1).

In Svalbard, we observed the first radioactivity as soon as May 4 in a snow precipitation on the Austfonna glacier (79°50′ N, 25°30′ E); there were further arrivals of radioactive products on this glacier with precipitations of 10, 11, 17, 18 and 25 May. The greatly contaminated deposition of May 10 and 11 may be explained by the high-pressure (1,035 mbar) centred on Novaya Zemlya moving progressively to the East and the low-pressure area spreading from Iceland to the North Pole. On 11 May, a warm front crossed the Austfonna glacier, north east of Svalbard, at 06:00 at a speed of ~ 15 knots, moving first to the north and then towards the north-west, heading for Greenland. It was followed by a cold front going past the Austfonna glacier at ~ 18:00 on 11 May, preceeded by strong precipitation.

At Ny-Alesund (78°55′ N, 11°56′ E) station, the old snow crust sampled on 8 May was not radioactive, but the fresh snow collected on 13 May was contaminated, which shows that the greatest amounts of pollutants have been washed out by the snow precipitation, as has been previously observed for rain[1], and that the dry deposition is at a low level.

The fresh snow samples of May 8 and 12 from 81°36′ N and 84°13′ N show that the pollution has reached these extreme latitudes and that the calculated concentrations are of the same order as that measured during the high atmospheric nuclear tests in 1963[2].

The many glaciers present in the Northern Hemisphere constitute an accurate record of isotope release from Chernobyl.

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1. Hohennemer, C. *et al. Nature* **321**, 817 (1986).
2. Holdsworth, G. *et al. Atm. Env.* **18**, 461 – 466 (1984).

Table 1 Gamma activity, 6–12 May and beta activity on 3 June

		Gamma activity		Beta activity
		$Cs^{134}+Cs^{137}$ (Bq kg^{-1})	Cs^{134}/Cs^{137} ratio (%)	(Bq kg^{-1})
Greenland				
Station Nord	8 May snowfall	0.38	54	0.38
81°36′ N, 16°40′ W	(13–19 h GMT)			
	12 May snow surface	0.42	47	
	(11 May snow fall)			
Sea Ice Station	12 May snow surface			1.33
84°13′ N, 17°50′ E	(11 May snow fall)			
Svalbard				
Austfonna	4 May snow surface	0.02		0.15
	(old deposition)			
Austfonna	4 May snowfall	0.15		0.46
	10–11 May snow fall			8.84
	17–18 May snow fall			1.38
	25 May snow surface	0.41	60	1.08
	(after blowing snow)			
Ny-Alesund	8 May snow surface	0.00		0.05
	(old deposition)			
	13 May snow surface			
	(after snow fall)	0.14		0.15

Data obtained with assistance from ARCTEMIZ, "Femmes pour un pôle", Laboratoire de Glaciologie, M. Riviere (French Embassy) M. Richez and Tromsø Meteorological Station.