gate population properties of the kind involved here is not new[4] and their validity is currently being investigated[5,6]. So far, we can find no objection in principle to the technique, although the selection mechanism used to obtain a sample is obviously confounded with some behavioural properties, thus invalidating its use for certain purposes. In the present instance, the difference between our results and those of Hebert does not seem to be accountable to such artefacts and we do not question the validity of either set of data. Consequently, one must either reverse Hebert's "generally conceded" initial premise, or, following their logic, regard our result as establishing that abundance is positively dependent on competition in the Malham and Bangor communities.

As Hebert *et al.*[1] point out, we are not here concerned with replacement competition but with the diffuse competition[7], resulting from common environmental interests[4] and mortality factors, in which the theory of island biogeography[8] has generated much interest. While we have good reason to regard neither experiment as conclusive, because both are partial, our positive result might seem to indicate the negative competition allowed for in Hutchinson's original niche concept[9].

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HEBERT ET AL. REPLY—Since diffuse competition in Lepidoptera, as we view it, is the result of long term coevolution among lepidopterans, their food plants, predators and parasites, we would not expect these interactions to be strong in highly disturbed communities. The importance of analysing pristine communities in synecological studies of this sort has been recognised[1]. The drastic alteration of the original vegetation in Great Britain probably precludes such studies. Terborgh[1], for example, worked in a rainforest wilderness area of 20,000 km², whereas the least disturbed site in the Rothamsted Insect Survey consisted of 3.2 acres of 80-yr-old regrowth[2]. Our main study area (Perth Road, Ontario)[3] was somewhere between these extremes; within a 1-km radius of the collecting site there was little intrusion of introduced plants and forest composition approached a climax condition for the area. Beyond this distance most of the landscape was similar within a radius of 10 km, although scattered farms were present. Similarly, at our Chaffeys Locks site, much of the original vegetation remains intact.

With regard to the effect of environmental disturbance on abundance patterns in Lepidoptera we have data from Glenburnie, Ontario, a highly disturbed agricultural area about 20 km from the Perth Road site. These data (Table 1) resemble those of Taylor and Woiwod in so far as there is no indication of an inverse relationship between species abundance and family size such as existed at our Perth Road and Chaffeys Locks sites. In fact at Glenburnie the Noctuidae, the largest family, have the highest mean abundance, but this is largely the result of a single species represented by nearly 6,000 individuals. The apparent direct relationship between family size and species abundance found by Taylor and Woiwod may be the result of small sample size or possibly selective sample choice, for the Rothamsted Survey collections were made at 160 sites[4], only two of which are reported here[5]. From this same standpoint we should make it clear that we have made collections at only three sites, two in the undisturbed areas described previously[3] and the remaining collection at Glenburnie.

Table 1 Species abundance at Glenburnie, Ontario

	No. of species	No. of individuals per species
Noctuidae	248	51.85
Geometridae	86	25.38
Notodontidae	28	7.68
Arctiidae	27	42.15
Sphingidae	17	10.65
Other families	21	30.90

Collection was at one light during the 1969–70 season and totalled 17,226 individuals.

The difference between abundance patterns in disturbed and natural habitats is probably a reflection of the increased variance in patch size, characteristic of cultivated areas in which small remnants of the native vegetation persist in the midst of a floristically depauperate agroecosystem. Often the largest patches in such heterogeneous environments represent novel vegetation resources. For example, in south-eastern Ontario the most important elements of the agricultural grassland are introduced species[6]. Assuming the ability to use such novel resources is fortuitous, then one would expect that the species using these patches would tend to belong to the larger families of the original source fauna and, other factors being equal, these species should be overwhelmingly abundant.

We feel that confirmation of the importance of diffuse competition should only be sought in the analysis of data collected in areas where human disturbance is minimal. We predict that the effects will be most pronounced in homogeneous areas of long term stability, such as tropical rainforest, where variance in patch size is low and thus where one *a priori* expects species equitability to be high.

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Gravitational analogue of the magnetic force

SALISBURY AND MENZEL[1] have considered the case of a pair of charged masses separated by a distance, r, moving together at a velocity, v, in the direction perpendicular to the line joining their centres. The charges and masses were chosen so that the electrical and gravitational forces cancel one another in the moving coordinate system. Using only special relativity, Salisbury and Menzel arrived at the conclusion that the gravitational equivalent of the magnetic force is

$$\gamma^3\beta^2(2-\beta^2)(Gm_1m_2/r^2)$$

where m_1 and m_2 are the rest masses, $\beta = v/c$, $\gamma = (1-\beta^2)^{-1/2}$, and G is the gravitational constant.

The correct special relativistic expression is arrived at as follows. The trans-