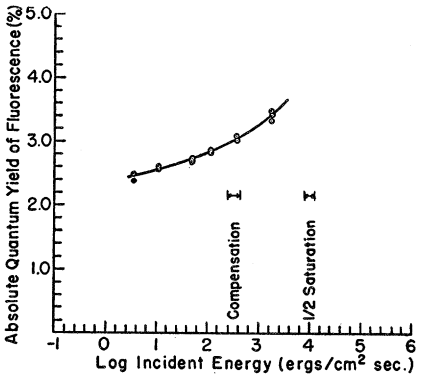

Fig. 1. Quantum yield of fluorescence of *Chlorella* cells. Yield is shown as a function of the logarithm of the intensity of the exciting beam (averaged over its path in the vessel). $\lambda_{ex.} = 436$ mμ. The same values plotted on a linear rather than semilogarithmic scale lead to a curve that is concave downward rather than upward.

photosynthesis-saturating intensities, is not applicable at the low intensities studied here. Apparently, the intensity dependence of ϕ *in vivo* is due to two (or more) factors that come into play in different intensity ranges. The change in ϕ near or below the compensation point may reflect the participation in photosynthesis of respiratory intermediates whose relative importance must decrease as the intensity increases.

We did not observe an inflection in the $\phi = f(I)$ curve corresponding to the one reported by Kok (*8*) for photosynthesis. But kinetic considerations show that, even if different factors govern ϕ primarily in different intensity regions, such inflections would not necessarily occur.

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References and Notes

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Sperm Transport in the Reproductive Tract of the Female Rabbit

Previous estimates of the time required for sperm ascent in the reproductive tract of the female rabbit usually have been based on flushing various regions of the tract at definite intervals after mating (*1, 2*). The present note offers another approach to the problem—namely, tubal ligation at various times after mating and the subsequent examination of the trapped eggs for evidence of fertilization. While this work was in progress, a paper using the same technique with several variations appeared (*3*); the results reported here confirm Adams' findings.

Mature New Zealand giant white does were used in the experiments (*4*). The rabbits were bred once to males of proved fertility. At intervals of 0.5, 2, 3, 4, and 5 hours *post coitum*, laparotomies were performed, and the fallopian tubes were doubly ligated and sectioned at the uterotubal junction. The rabbits were killed between 48 and 52 hours *post coitum*, the tubes were flushed with 0.9 percent saline solution, and the recovered eggs were then examined for evidence of normal cleavage and development.

The results indicate that sufficient sperm are in the tubes of every animal by 5 hours *post coitum* to fertilize all viable eggs (Table 1). The increase in the percentage of fertilized eggs between 4 and 5 hours *post coitum* parallels a similar rise in the number of sperm recovered from the tubes during the same time span (*2*). However, it is misleading to account for the increased percentage of fertilized eggs on the basis of an increase in the *mean* number of spermatozoa. The most likely explanation for the increased percentage of fertilized ova is that sperm have reached the tubal level of *every* animal by 5 hours *post coitum*. Before this time, there is considerable individual variation in the rate of sperm entry into the tubes as measured by the number of animals with fertilized ova at different hours *post coitum* (Table 1).

Table 1. Fertilizing ability of rabbit sperm in ligated fallopian tubes. (Eggs examined 48 to 52 hours *post coitum*).

Time *post coitum* tubes ligated (hr)	No. of rabbits	No. of follicular rupture points	No. of eggs recovered	Percentage of fertilized eggs	No. of animals with fertilized ova
½	3	21	20	0	0
2	5	48	31	19	1
3	5	54	53	47	3
4	5	29	25	40	3
5	5	46	41	98	5

Differences from animal to animal in uterine motility and in the mechanical barrier offered by the cervix and uterotubal junction probably account for the variability in the rate of sperm transport before 5 hours *post coitum* (*2, 5*).

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Cold-Adapted Genetic Variants of Polio Viruses

Variants of the polio viruses have been obtained through passage in various *in vitro* systems. Enders, Weller, and Robbins (*1*) passaged the Brunhilde strain (antigenic type I) in tissue cultures of human embryonic skin muscle and obtained a variant of reduced virulence for monkeys. Sabin, Hennessen, and Winsser (*2*) have obtained variants of Mahoney (type I), Y-SK (type II), and Leon (type III), which are also relatively avirulent in monkeys, through passage at 1-day intervals with large inocula in tube cultures of cynomolgus monkey kidney cells. Li, Schaeffer, and Nelson (*3*) have combined passages *in vitro* with passages *in vivo* to obtain variants of Mahoney and Leon which show various patterns of virulence for mice and monkeys. Melnick (*4*) has also reported attenuation of polio viruses through serial passages of high concentrations of virus in tissue culture. Dulbecco and Vogt (*5*) have obtained an *r* (rapid) mutant of Brunhilde through serial rapid passage on monolayer cultures of cynomolgus monkey kidney cells. Slow Mahoney (*6*), a genetic variant of Mahoney that produces relatively tiny plaques on monolayers of monkey kidney cells, was isolated after propagation of the parental Mahoney on HeLa cells. In the work reported here (*7*), cold-adapted genetic variants of the polio virus strains Akron (type I), Brooks (type II), and Mabie (type III) have been obtained through passage at 30°C on monkey kidney cells.