ethylene oxide. Although all of the organisms were not destroyed by this treatment, there was a marked reduction in the count.

We wish to emphasize that we have not determined the effects of ethylene oxide on foods intended for human consumption or on practical animal foods other than our stock diet. Processing frequently is detrimental to the nutritional qualities of foods, and desirable changes must be weighed against the damage done. Nevertheless, in view of the afore-described results, it is suggested that foodstuffs, particularly those that may be major sources of essential nutrients, should not be subjected to ethylene oxide treatment until its effects have been established.

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References and Notes

1. C. R. Phillips and S. Kaye, *Am. J. Hygiene* **50**, 270 (1949).
2. Anon. *Chemical Week* (2 Oct. 1954), p. 96.
3. Containing alpha-tocopherol acetate 10 mg and Natola (Parke, Davis and Co.) to supply vitamin A 550 USP units and vitamin D 110 USP units.
4. Salt mixture W, obtained from Nutritional Biochemicals Corp., Cleveland, Ohio.
5. Containing the following in milligrams per 100 g finished diet: thiamine HCl 0.4, riboflavin 0.6, pyridoxine HCl 0.5, nicotinic acid 4.0, Ca pantothenate 4.0, folic acid 0.2, biotin 0.02, choline chloride 200, inositol 20, and menadione 0.2 in cornstarch. Vitamin B_{12} (0.02 mg) was added separately as a water-alcohol solution.
6. Hunt Club dog meal, manufactured by Animal Foundation, Inc., Sherburne, N.Y.
7. These animals were divided into groups having comparable average weights when the treated diet was started.
8. The *B. globigii* spores were supplied through the courtesy of Charles R. Phillips and Saul Kaye, Camp Detrick, Frederick, Md. We also wish to acknowledge the valuable technical assistance of Ruth Clary and Samuel M. Takahashi.
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23 November 1954.

On "Improving Scientific Communication"

It is refreshing to read the clear description that S. M. Garn [*Science* **121**, 7A (21 Jan. 1955)] has given of the diversification in requirements, specifications, and style in the imposing forest of scientific journals. The problem has been in existence a long time. It has been aggravated by the rapid increase in the number of journals in print. Authors have been unduly put upon to adhere to often silly differences among journals. Industrial and government laboratories have found it expedient to maintain files of journal specifications and assign personnel to become familiar with the journal idiosyncrasies. Academic authors must rewrite and check style mechanics with copies of a given journal before submitting an article for publication. Publication of valid research is in jeopardy unless these details are scrupulously adhered to in writing.

I urge that AAAS implement the wise suggestion made by Garn. A small steering committee should outline the items of confusion and invite 10 or 20 editors from the journals of largest circulation to study the problem and meet in plenary session to establish unanimity among the many mechanical impedimenta to manuscript preparation. Perhaps several of the larger trade journals should be included.

With such problems out of the way, authors, editors, and reviewers could devote increased attention to the more difficult problems of clarity and conciseness of expression, accuracy and originality of presentation.

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3 February 1955.

Science and Poetry

I have read with great interest the excellent editorial entitled "Science and poetry" and also several stimulating communications on the same subject [*Science* **120**, 17A and 951 (3 Dec. 1954)].

I was delighted to find that Phyllis McGinley was cited as holding the threads of the matter in the palm of her hand. I think she does. Of all her *Love Letters*, her "In praise of diversity" (which Louis Untermeyer, in the *Atlantic Monthly* for December, correctly called an "essay") seems most relevant to the point of issue.

I suggest that no discussion of this subject would be complete without reference to James B. Conant's Franklin Medal lecture of 19 Nov. 1943 before the American Philosophical Society on the general subject "The advancement of learning in the United States in the post-war world" [*Proc. Am. Phil. Soc.* 87, 291 (1944)]. Among other things, Conant had this to say:

> Let me now turn from the first category—accumulative knowledge—to the other two which, following Bacon closely, I shall designate as poesy or, if you prefer, poetry and philosophy. Whereas the idea of progress is both valid and significant in the first category, accumulative knowledge, in the other two the concept is not only invalid but a positive deterrent to relevant undertakings. And at this point, lest all but scientists, mathematicians, and archaeologists leave the room in protest, I hasten to assert that I place no halo over the word progress. There is no hierarchy implied in my classification.
>
> Indeed, anyone who wished to give poetry or philosophy an inferior place as compared to accumulative knowledge would soon find himself in an untenable position. For it is obvious that poesy or poetry on the one hand and philosophy on the other together hold the keys to man's immediate future, including the future of the advance of accumulative knowledge. That this is so, current history provides ample proof. Nazism triumphed in Germany not because the Germans were lacking in power to advance learning but because bad poetry and a wrong philosophy prevailed. . . .
>
> One of the chief ends of education is surely to develop the capacity for making civilized judgments on all those matters of value which are involved in so many vital human decisions. Such judgments can be

illuminated often by our knowledge of the past experiences of the race, but they are largely determined by emotional reactions and channels of thought whose pattern by necessity varies from age to age. It is thus the poetry and philosophy of the present, rather than accumulative knowledge, which play the significant role in outlining the next act in the drama of world history.

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14 December 1954.

Q_{10} of the Maximum Tetanic Tension Developed by Isolated Muscle Fibers of the Frog

The experiments (*1*) reported here are essentially confirmatory in nature to those previously analyzed by Bull (*2*). Therefore no review of the extensive literature on the Q_{10} of the maximum developed tetanic tension of muscle will be undertaken.

The technique of isolation, recording, and measurement was the same as that previously described (*3*), except that the stimulator was a Harvard inductorium. The electrodes were two chlorided silver wires each placed one-third of the length of the fiber from each end. The length at which the fiber developed maximum tetanic tension was determined at some particular temperature, and the fiber was stimulated at this length subsequently. The lever was not calibrated for absolute tension. No particular rule was followed in the order of the variation of temperature, but in all instances a complete cycle was carried out; an experiment was rejected if the fiber did not develop approximately the same tension on return to its original starting temperature. The temperatures were changed gradually and the range was limited from 0° to 25°C. Very few experiments were performed at temperatures above 22°C because in many fibers the tetanus was incomplete at higher temperatures.

The results were quite variable. Earlier (*4*) it was noted that when a fiber shortened unevenly it developed more tension than it did when it shortened evenly along its length, but that if stimulation was continued long enough any unevenness became distributed and the tension fell to a value characteristic of the evenly shortened fiber. In order to maintain a tetanus long enough for this to occur the stimulus frequency must be carefully adjusted for each temperature. In particular, the frequency of stimulation for a maintained tetanus at very low temperatures must be very low indeed. The tetanus cuts off quickly at low temperatures if the fiber is stimulated by a Harvard inductorium (*5*). The variable frequency stimulators available to us at the time did not have sufficient power output to compensate for the Ringer solution shunt unless the electrodes were dangerously near the fiber. In theory, multiple cathodes should minimize any unequal shortening, but in practice this has a negligible effect as contrasted with alternating cathodes placed as described in the previous paragraph for single muscle fibers, because the majority are so uneven in cross section along their length. A further contributing factor to the variability in the results must have been the alteration in conduction velocity with temperature (*6*).

Table 1. Data illustrating the variability in two typical experiments.

Expt.	Temp. (°C)	Tension (arbitrary units)	Time (min)
3	16.5	97.8	0
	16.5	100.0	15
	16.5	100.0	20
	7.8	91.1	58
	7.8	91.1	85
	17.0	96.8	110
	21.3	98.0	130
	10.0	88.7	155
	16.8	94.5	175
4	10	90.3	0
	18	97.2	17
	17	97.2	49
	17.7	100	55
	10	91.7	164
	10	94.4	180
	25	97.2	227

Table 1 illustrates the variability in two experiments that were accepted as satisfactory. In both of these the tension tended to be low at the low temperatures, but in others it was high. In each of the eight experiments accepted as satisfactory out of the 25 done, the maximum tension was plotted against the temperature in degrees Celsius, and the best straight line through the points was determined by the method of least squares. The Q_{10} was then determined from the slope of this line. In Table 2 a is the intercept of the line, b the slope, and Pa and Pb the probable error of the intercept and slope, respectively. It will be noted that the probable error of the slope b is of the same order of magnitude as the slope itself. It is therefore likely that within the limits of experi-

Table 2. Q_{10}'s of the maximum developed tetanic tension of eight single muscle fibers with the constants and the probable errors of the least square lines from which they were calculated.

Expt.	Intercept a	Slope b	Probable error		Q_{10}
			Pa	Pb	
3	89.7	+ 0.34	3.21	0.21	1.038
4	90.6	+ 0.31	2.27	0.14	1.033
5	78.5	+ 0.78	1.98	0.13	1.100
6	74.8	+ 0.73	3.74	0.20	1.098
12	82.3	+ 0.53	4.12	0.22	1.063
13	91.0	− 0.34	8.77	0.49	0.963
14	80.6	+ 0.66	14.2	0.86	1.080
15	81.8	+ 0.84	10.5	0.36	1.103