CHAPTER 16

TECHNICAL OR RESEARCH REPORTS

IN THE discussion of the arrangement of material in Chapter 12 a fourth scheme was mentioned: a scheme for writing of technical news in technical reports, research papers, and articles for publication in the technical and professional journals. Essentially the same arrangement is used when such material is issued in technical bulletins.

Many of the most important technical news stories of experimental and research results have first been told in this form. The arrangement can hardly be called a news story arrangement, however. It is formal. It was adopted many years ago by research workers in scientific fields and adhered to very strictly because it seems to them to be the most desirable arrangement for their purpose. These papers—the newspaper man is not inclined to call them "stories"—are intended to make a record of research findings, they are intended for fellow research workers, and they are written in technical language that is not readily understood, if at all, by the general public. Inasmuch as the arrangement suits most of the men and women in the research field, they have a right to prefer it.

The arrangement: The arrangement used may be called a logical one and proceeds as follows:

1. A statement of the problem studied or investigated.

2. A review of literature relating to the subject and a discussion of previous research bearing on the particular point or points involved.

3. A description of materials, methods, equipment, and special technique involved.

4. The results, presented in as much detail as the author deems necessary and desirable. They are usually presented in chronolog-

ical order and accompanied by statistical tables. These results are discussed as fully as necessary to make them clear.

5. The conclusions reached by the author are presented as well as any applications or implications that seem to be involved.

6. A bibliography may be presented in footnotes as well as acknowledgements.

To illustrate the differences between a straight newspaper and a technical report, two articles are presented. Both were published in *Science*, the official organ for the American Association for the Advancement of Science. Both report California experiments with the use of Vitamin B_1 in plant growth, so they are quite similar as to subject matter. But the first was prepared by *Science Service* to be syndicated to daily newspapers; the second is strictly a technical paper.

A comparison will show plainly the differences in construction and in phrasing:

ORANGE TREES AND VITAMIN B_1

(From *Science Service*)

Healthy valencia orange trees, grown under favorable conditions, failed to show any improvement from good to superior when vitamin B_1 and nicotinic acid were added to soil and irrigation water. This was the report of Dr. E. R. Parker and Dr. F. M. Turrell, of the Citrus Experiment Station, and Dr. James Bonner, of the California Institute of Technology, on experiments carried on at Riverside.

Young trees were planted in good soil, well drained and aerated. At the time of planting organic matter in the form of peat and dairy manure was added to the fill-in soil and as a surface mulch; the usual procedure. As the trees grew, vitamin B_1 and nicotinic acid, another factor in the vitamin B complex, were added generously to the irrigation water continually throughout two seasons. Now vitamin B_1 can do remarkable things for humans deficient in the substance. It also stimulates growth in some plants. But healthy young valencia orange trees, according to the scientists, apparently have no use for vitamin B_1 or nicotinic acid.

"It appears," they said, "that vigorous young valencia trees synthesize sufficient vitamin B_1 for their own needs. The vitamin B_1 content of the mature leaves was not affected by any of the soil treatments. In all cases it was higher than that of species of plants which responded to treatment with vitamin B_1. The beneficial effects of the organic matter applied to newly planted trees appears to be due to factors which were not limiting in these experiments."

EFFECTS OF VITAMIN B_1 ON WOODY EROSION-CONTROL PLANTS[1]

(From *Science*)

Recently there has been considerable interest in the use of vitamin B_1 for stimulating plant growth. The results reported here are concerned with the relation of added vitamin B_1 (thiamin chloride) to the survival and growth rate of young woody erosion-control plants in the field. By woody erosion-control plant is meant one that possesses to a high degree the ability to withstand indifferent handling, drought, adverse soil conditions, and vigorous competition. For deciduous erosion-control plants, these requirements are best realized by planting seedlings with strong taproots that are large in proportion to the size of the tops and that contain much stored food.

Plantings were made at two locations: (1) On recent sandy alluvial soil in an intermontane valley in the Santa Rosa Mountains, in Riverside County, California. The Santa Rosa planting is in a mountainous mediterranean climate. (2) On primary heavy grassland soil near Capistrano, Orange County, California. The Capistrano planting is in a coastal mediterranean climate, with moderately cool summers. Precipitation during the experimental period was at or above normal.

Seedlings were planted in natural soil in holes dug by shovels to a depth just sufficient to accommodate roots without bending. Soil was filled back into holes and tamped by shovel and by hand. Around each plant a ring of soil was thrown up to form a basin; subsequent waterings were made in these basins from tank wagons. At Capistrano domestic tap water was used; at Santa Rosa water from a surface reservoir was used. Where vitamin B_1 was used in the experiment, it was added at the rate of .05 mg. per liter of water.

TABLE 1

Percentage Survival of Control Plants and Vitamin B_1 Treated Plants at the Santa Rosa Site in Riverside County, California

Note—The extensive table is not presented, not being essential to the presentation of form of arrangement of the paper.

Species listed in Table 1 were planted April 6 to 15, 1939. All these plants received water at planting time and two weeks later. On these two occasions no vitamin was added. On May 17, 1939, vitamin solution was applied to basins of plants listed in Table 1 as treated plants. On the same date coordinate applications of water were made to control plants. Applications similar to those given May 17, 1939, were repeated June 8, July 10, and August 8, 1939. No further applications were given after August 8, 1939. The total amount of the vitamin solution added to the basin of each of the plants receiving the vitamin is shown in Table 1.

[1]Field and clerical assistance was furnished by the Works Project administration.

For the Santa Rosa site, Table 1 shows the survival of control plants and of treated plants during 1939 and 1940. The differences between the new shoot growth of the treated plants and of the control plants were not significant at any time during the test at Santa Rosa.

The species listed in Table 2 were planted April 10 to 20, 1939. The plants grown at this Capistrano site differ in their treatment from those of the Santa Rosa site. At the Capistrano site vitamin solution was applied immediately after planting to the basins of treated plants. Control plants at planting time received coordinate applications of water to which no vitamin was added. Applications of water (no vitamin added) to control plants and of vitamin solution to treated plants were given on May 1, May 24, June 20, July 20 and August 14, 1939. No further applications were given after August 14, 1939. Total amount of the vitamin solution added to the basin of each of the plants receiving the vitamin is shown in Table 2.

Table 2 shows the percentage survival of control plants and of treated plants in the test at Capistrano. No significant differences were found in the new growth of the treated plants and of the control plants at the Capistrano site.

TABLE 2

Percentage Survival of Control Plants and Vitamin B_1 Treated Plants at the San Juan Capistrano Site in Orange County, California

Note—Table omitted. See explanation in Table 1.

Conclusions: For the plants tested, no marked beneficial effects were found in the initial survival or initial growth by adding vitamin B_1 in water (in concentration of .05 mg. per liter of water) to the soil surrounding the plants. The data on survival suggest that added vitamin B_1 may have had, under the conditions of the experiment, an adverse effect on the survival of some of the species tested.

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The above report is news, just as much as is the Science Service story. If it were written for a daily newspaper, the lead would be in the last paragraph, where conclusions are given.

No further discussion as to the writing of these technical papers or reports is given in this text. Many students in technical lines have a course in advanced English where the writing of such reports is taken up in some detail.