Better Crops WITH PLANT FOOD

November-December 1963

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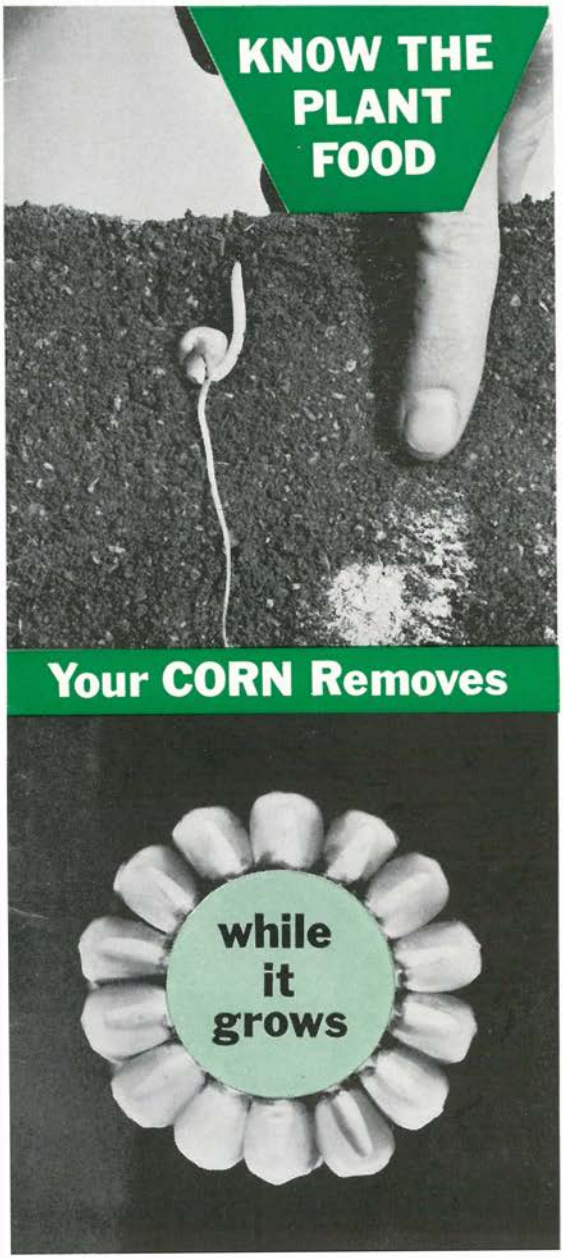

A TEACHING and SERVICE TOOL

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BROUGHT UP TO DATE

The corn plant produces almost half of its total weight during the third month of the growing season.

This is one of the interesting facts found in a research project carried on jointly by the Ohio Agricultural Experiment Station and USDA. In this experiment, they measured not only the amount of growth produced, but

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Better Crops
WITH PLANT FOOD

The Whole Truth—Not Selected Truth
$1.00 for 6 Issues, 20¢ Per Copy

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CONTENTS

ON THE COVER

. . . we feature the new cover of our revised corn folder which explains the plant food absorbed by an acre of corn during different periods of growth.

From Alfalfa: an extra $28.62 per acre

Top-dressing alfalfa with borated fertilizer pays for itself—better than 3 times over! In Wisconsin alone, averages for 316 alfalfa demonstrations (with borates added to the mix) harvested from 1955 through 1959, gave these dramatic results:

Treatment	Fertilizer Acre Rate	Acre Yield Dry Matter	Increase Per Acre	Increased Value	Fertilizer Cost Per Acre	Net Profit Per Acre
Top-dressed with 0-10-30B	480 lbs.	8368 lbs.	2970 lbs.	$37.12	$8.50	$28.62
Not top-dressed		5398 lbs.				

Source: Mimeo report, C.J. Chapman, Soils Dept., University of Wisconsin

Millions of acres of alfalfa need applications of the trace element, boron, every year. We offer 4 economical sources of boron—each product designed for special needs. Consult state agricultural authorities for specific amounts of boron to use.

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More Corn PROFITS From Right Fertilizer APPLICATION

What is the best way to apply fertilizer on your corn crop?

Should you apply all the plant food in the row or broadcast part of it? Is it better to plow down your broadcast fertilizer or apply it after the land is plowed?

These questions are often asked by farmers growing corn.

Three basic methods of applying fertilizer on corn are the *planter application, broadcast,* and *sidedress.* Let's look at what each method can mean to the profits from your corn crop.

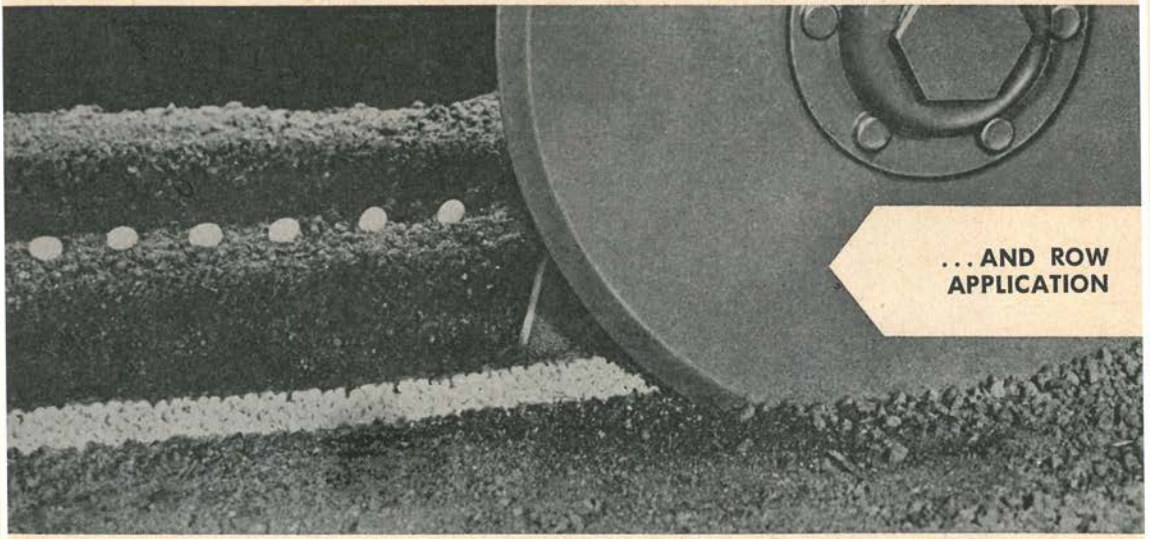
ROW APPLICATION . . . As A Starter

The planter row application should have first call on any fertilizer used on corn. Fertilizer placed in the row is important because it is close to the developing root system and gets the corn plants off to a fast start. This is especially true on cold wet soils in the early spring.

Table 2 shows the increase of corn yields from fertilizer in the row at three locations in Maryland. Note how the yield was increased by as much as 41.7 bushels and the return from fertilizer was as high as $37.73 per acre.

Other test plots in Maryland have

• PLOW DOWN • IN THE ROW • SIDEDRESS



By J. R. Miller University of Maryland

shown large yield increases with row application.

Fertilizer placed in a single band about two inches to the side and below the corn seed gives excellent results. With this type placement, you can safely apply up to 500 lbs. per acre of most mixed fertilizers in the row.

However, for best corn yields and profits on most Maryland soils, you need additional fertilizer to that placed in the row. This additional fertilizer should be broadcast and plowed under, and on lighter sandy soils a part of the nitrogen should be sidedressed.

In general, we suggest about 200

TABLE 1—CORN YIELDS AND RETURN ON A SASSAFRAS LOAM SOIL

N-P_2O_5-K_2O Fertilizer Treatment				
Sidedress	Row	Plow Down	Yield	Return from Fertilizers[1]
Lb/A	Lb/A	Lb/A	Bu/A	$/A
0–0–0	0–0–0	0–0–0	50.3	——
0–0–0	18–36–36	0–0–0	74.3	**$23.25**
40–0–0	18–36–36	0–0–0	73.6	**$17.58**
40–0–0	18–36–36	0–60–60	91.6	**$31.43**
0–0–0	18–36–36	40–60–60	90.0	**$29.44**
0–0–0	18–36–36	40–60–60[2]	80.2	**$17.19**
80–0–0	18–36–36	0–60–60	99.4	**$36.39**

Source: Axley, J. H., and Miller, J. R. Department of Agronomy, University of Maryland

[1] With corn at $1.25 per bushel

[2] The fertilizer was applied after plowing and disked in

PLOW DOWN AND IN THE ROW

Bob Townsend (left) averaged 118 bushels per acre of dry corn on this 88-acre field. James Weamert, Kent County (Md.) Agent (right), reports Townsend applied 90 lbs nitrogen, 60 lbs phosphate, and 60 lbs potash per acre *plow down* and 18 lbs nitrogen, 36 lbs phosphate, and 36 lbs potash *in the row as a starter.* Townsend, who grows about 300 acres of corn, has his soil tested.

118 Bushels Per Acre On This 88-acre Field

to 400 lbs. per acre of mixed fertilizer for the row application and amounts above this for broadcast.

BROADCAST APPLICATION . . . In Addition To Row

Table 1 shows the importance of both broadcast and row applications.

With no fertilizer, the corn yield on Sassafras soil was 50.3 bushels per acre. When 18 lbs. of N, 36 lbs. of P_2O_5, and 36 lbs. of K_2O per acre were applied in the row, the yield increased 24 bushels—to 74.3 bushels—representing a $23.25 per acre return from fertilizer. An additional 40 lbs. of N per acre sidedressed did not increase the yield.

However, when 60 lbs. of P_2O_5 and 60 lbs. of K_2O were plowed down along with the row application and the sidedressing of N, the yield was increased to 91.6 bushels per acre. This shows the importance of broadcast application in obtaining top yields and maximum profits from corn.

Broadcast fertilizer should be

plowed down for best results. In a number of Maryland tests, plow down applications have given about 10 bushels *more corn* per acre than the same amount of fertilizer broadcast and disked in after plowing.

For example, on Sassafras soil the yield was 90.0 bushels per acre from 40 lbs. N, 60 lbs. P_2O_5, and 60 lbs. K_2O per acre plowed down, 80.2 bushels from same amount applied after the land was plowed. When necessary to broadcast the fertilizer after plowing, disk it into the soil as deeply as possible.

SIDEDRESS APPLICATION . . . For Part of Nitrogen

Nitrogen is more easily leached from soils than the other major plant food elements. For this reason, on the lighter sandy soils (loamy sands, sandy loams), you should sidedress part of the nitrogen used on your corn crop. Apply this nitrogen when the corn is 12 to 18 inches tall.

On medium to heavy soils (loams, silt loams, clay loams, etc.) where leaching is not as serious a problem, the nitrogen can be broadcast and plowed under, or it can be applied as a sidedressing.

Corn requires relatively large quantities of nitrogen. For example, a 125 bushel corn crop (grain and stover) will remove approximately 200 lbs. N, 75 lbs. P_2O_5, and 150 lbs. K_2O from the soil.

However, a well balanced fertility program, including adequate phosphate and potash, as well as other essential nutrients, is vital.

Table 2, from a test plot on Sassafras soil, illustrates this point:

When 40 lbs. N per acre was applied as a sidedressing, the yield did not increase over row application and the return was $5.67 less per acre. However, when phosphate and potash were plowed down, the response to the sidedressed nitrogen was good because these two plant food elements were not limiting the yield.

PLANT FOOD REQUIRED . . . How To Determine It

The plant food required for your corn crop depends on (1) the yield you aim to produce, (2) level of available plant nutrients in the soil,

TABLE 2—CORN YIELDS AND RETURN WITH ROW APPLICATION

Soil Type	N-P_2O_5-K_2O Treatment In Row	Yield	Return from Fertilizers[1]
	Lb/A	Bu/A	$/A
Howell F.S.L.	0–0–0	25.4	——
	50–50–50	67.1	**$37.73**
Beltsville Si.L.	0–0–0	42.7	——
	20–40–40	61.7	**$14.75**
Dragston S.L.	0–0–0	66.9	——
	15–30–15	79.6	**$ 9.58**

[1] With corn at $1.25 per bushel

(3) amount of manure to be applied, and (4) the crop (legume, grass or stalks) to be plowed under.

To determine your crop's lime and fertilizer needs, have your soil tested. From such tests and yield crop history, you can secure more specific recommendations on the amount of lime and fertilizer your corn needs.

SUMMARY

1. Fertilizer applied in the row gets corn plants off to a good start. Increases in yield and profits from fertilizer in the row are good.
2. To grow top corn yields on most soils, you should apply fertilizer both broadcast and in the row. For best results, the broadcast fertilizer should be plowed down.
3. On light sandy soils (loamy sands, sandy loams) you should *sidedress part of the nitrogen* when the corn is 12 to 18 inches tall. On medium to heavy soils (loams, silt loams, clay loams, etc.) where leaching is not as serious a problem, you can plow down or sidedress the nitrogen.

THE END

Revised

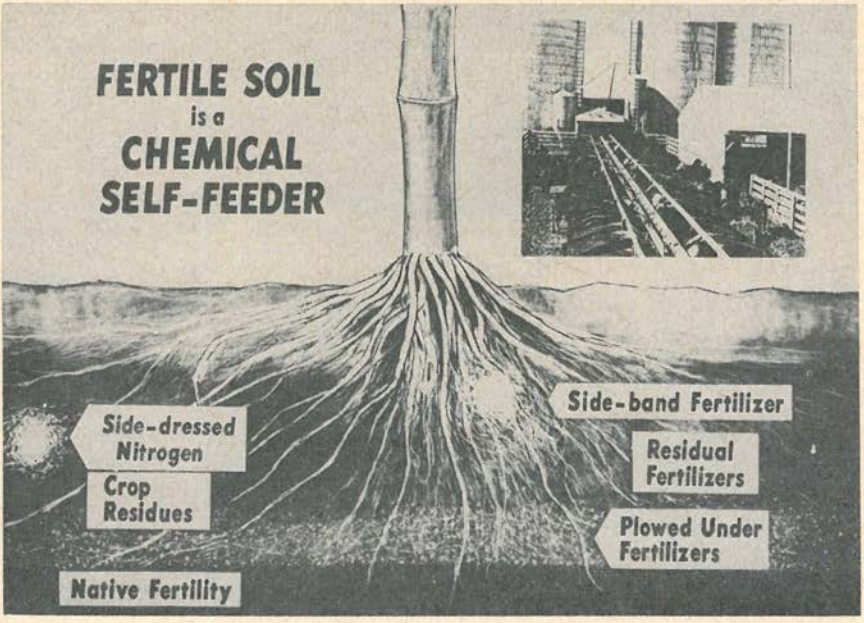
Corn

Folder

See Front Cover

And Pages 7-8

Order Today



FROM FRONT COVER

the amount of plant food absorbed during different periods.

The yield of corn was about 120 bushels per acre (adjusted to 15.5% moisture). The dry weights of the various plant parts at harvest were:

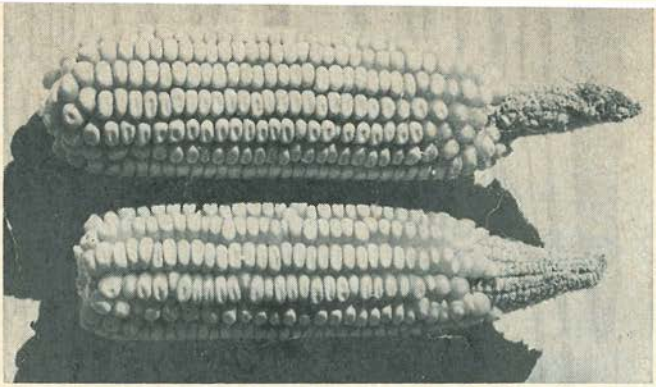
Leaves and stems	4,896 lbs.
Husk and cob	2,040 lbs.
Grain	5,832 lbs.
	12,768 lbs.

While root weight was not determined, it would be around 6,000 lbs. per acre. The 120 bushel crop of corn took up 145 lbs. of N, 71 lbs. P_2O_5, 141 lbs. K_2O (31 lbs. P and 117 lbs. K) in the above-ground portion.

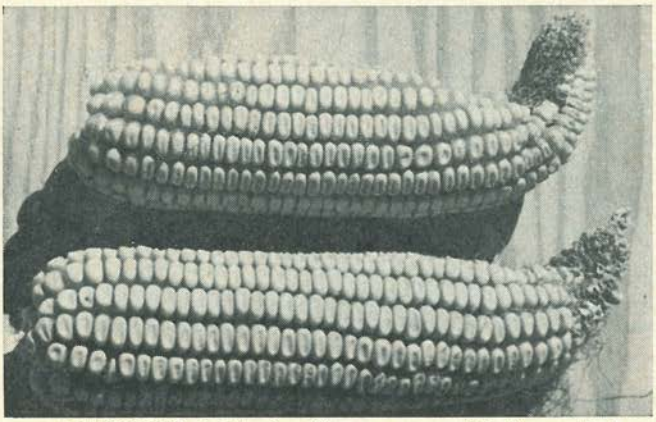
NITROGEN. During the first two months the corn took up 60 lbs. of N per acre, 41% of total requirement. The heavy pull was during tasseling and silking in the third month when corn took up 69 pounds—almost half of its requirement. In part of this period the plants took up an average of four pounds of N per acre per day.

PHOSPHATE (P_2O_5). During the first two months the corn took up 20 lbs. of P_2O_5 per acre—28% of total requirement. Even though early requirement in pounds of P_2O_5 is not as great as for N and K_2O, it is still very important. Because of soil-fertilizer reactions, only 20 to 30% of applied P_2O_5 is available the first year. Adequate quantities are important early as the ear starts forming before the plant is a foot high.

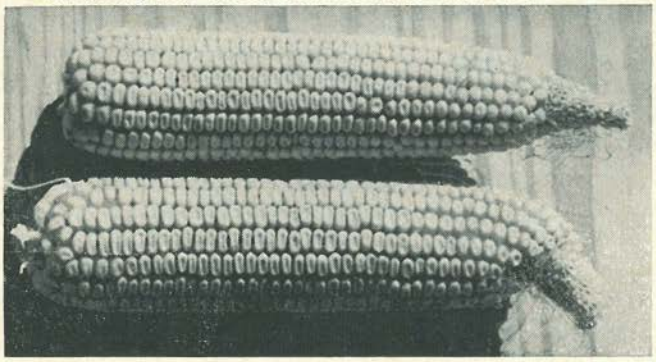
POTASH (K_2O). During the first two months the corn took up 98 lbs. K_2O —69% of total requirement. *It is interesting to note that corn takes up K_2O much earlier than N or P_2O_5.* In the



NITROGEN shortages result in ears with unfilled tips sharply pinched off. Normal-sized kernels have a bright, polished luster.



PHOSPHORUS deficiencies often are responsible for crooked and missing rows of kernels in twisted and small ears.



POTASSIUM shortages can cause chaffy nubbins, kernels that are loose on the cob and dull in color, and unfilled tips.

later part of the second month an average of 3.2 pounds per acre per day entered the plant. The maximum total was reached about three weeks after silking. Loss after that time was due to washing out of the leaves and stems or moving back into the soil through the roots.

If high yields are to be produced, the soil must be able to supply large amounts of plant food during periods of rapid growth. A *self-feeder* for animals and poultry supplies feed in the amounts needed for maximum growth. Likewise a soil should be a *chemical self-feeder* in order that plant food will not be lacking at any time from planting to maturity.

Recommendations for lime, N, P_2O_5 and K_2O based on soil tests are a guide. Soil tests help to determine how much plant food is in the *self-feeder*.

THESE FACTS IN FOLDER FORM

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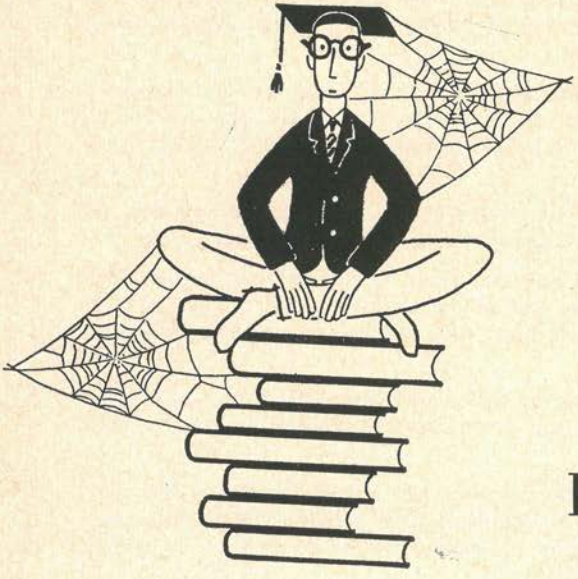
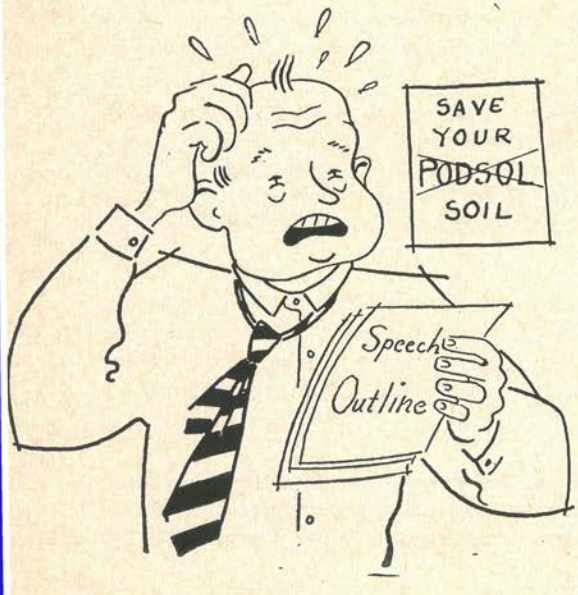
FROM ADDRESS ON BACK COVER

We all communicate with words. The other day, this editor read a note he had written about an idea he had just discussed with someone. The difference between the way he wrote about it and talked about it shocked even him, a word merchant. How pompous can one get when he starts to write? This section suggests some ways to make writing clear—at least as clear as the way we talk. —SWM



DR. WRITER and MR. TALKER



SPECIAL WRITING SECTION

SPECIAL WRITING SECTION —SWM

MAY you never have the nightmare I recently had, after dozing off on an airliner returning from a scientific convention.

Before falling asleep, I was reading some prize-winning sports stories of recent years, including the World Series game Don Larsen pitched in 1956: the no-hit, no-run, no-man-touch-first feat, written by *Washington Post* columnist Povich. He began this way:

> The Million-to-One Shot came in. Hell froze over. A month of Sundays hit the calendar. Don Larsen today pitched a no-hit, no-run, no-man-reach-first game in a World Series.
>
> On the mound at Yankee Stadium, the same guy who was knocked out in two innings by the Dodgers on Friday, came up today with one for the record books, posting it there in solo grandeur as the only Perfect Game in World Series history.
>
> With it, the Yankee righthander shattered the Dodgers, 2-0 and beat Sal Maglie, while taking 64,519 suspense-limp fans into his act.
>
> First there was mild speculation, then there was hope, then breaths were held in slackened jaws in the late innings as the big mob wondered if the big Yankee righthander could bring off for them the most fabulous of all World Series games.
>
> He did it, and the Yanks took the Series lead three games to two, to leave the Dodgers as thunderstruck as Larsen himself appeared to be at the finish of his feat.
>
> Larsen whizzed a third strike past pinch-hitter Dale Mitchell in the ninth. That was all. It was over. Automatically, the massive 226-pounder from San Diego started walking from the mound toward the dugout, as pitchers are supposed to do at the finish.
>
> But this time there was a woodenness in his steps and his stride was that of a man in a daze. The spell was broken for Larsen when Yogi Berra ran on to the infield to embrace him.
>
> It was not Larsen jumping for joy. It was the more demonstrative Berra. His battery-mate leaped full tilt at the big guy. In self defense, Larsen caught Berra in mid-air as one would catch a frolicking child, and that's how they made their way toward the Yankee bench, Larsen carrying Berra . . . *(Best Sports Stories—1956, Marsh & Ehre, E. P. DUTTON & CO., New York, N.Y.)*

Of course, Povich wrote on at some length, holding his readers to the last word. But slowly—it seemed—the hum of the jet engines gave way to a voice from a platform in a dark convention hall. I stretched to see the owner of the voice, droning behind a small light on the speaker's stand:

> ". . . this can be accomplished in the instance of qualitative variabilities by examining the external area associated with an algebraic function which has been found to represent the agronomic data. Occasionally the

> extremal response is pursued subject to a minimal level of a product quantity factor . . ."

And then the *cough* came: a nearby spasm, sharp but brief, yet enough to cut me off from the next point of the lecture. It was *rough*, being cut off from the "extremal response" that way. I felt sorry for the asthmatic cougher. But I felt stronger about losing four or five coughs-worth of that paper being read from the distant platform. I bent my ear sharply forward to get back on track and hear . . .

> ". . . it is observed that the extremal value occurs at the perimeter of the experimental data range in many of these problems . . ."

And then—just as I was straining for the "extremal value on the perimeter"—the cough returned, followed by a soft tap on my shoulder and a voice in my ear, "Would you like dinner?"

I thanked the stewardess for waking me to eat. As I lifted the book with Povich's prize-winning story on the World Series, a fantastic question hit my mind: how would the scientific voice in my dream report Don Larsen's historic game?

Here's how I think the scientist would report Larsen's game:

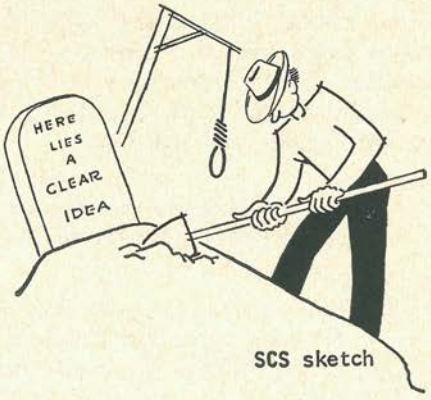
> An event occurred today which carried a probability ratio of one million to one and although the probability cannot be scientifically documented, that area of eternity known to some people of certain faiths as hell probably reached 32° fahrenheit or below as a result of this event.
>
> The event was demonstrated by Mr. Donald Larsen, an associate pitcher of baseball on the staff of the New York (City) Yankees, before an audience of 64,519 who came to view the demonstration. The demonstration was conducted from a pitching mound (a slightly raised area of earth situated equal distance from four points and in the center thereof around which the aims of the game are based) in the Stadium of the New York (City) Yankees.
>
> Prior to this event, Mr. Larsen had conducted an earlier demonstration with the same adversaries, the Brooklyn Dodgers baseball organization of Brooklyn, New York, which had resulted in failure due to the lack of cooperation by the Brooklyn organization which caused Mr. Larsen to complete less than 25% of his demonstration.
>
> In his second demonstration (the one herein reported), Mr. Larsen not only completed his demonstration but in the process, at the expense of Mr. Sal Maglie of the Brooklyn baseball organization, permitted neither Mr. Maglie nor any of his associates to reach any of the four points around which the game is based, which resulted in a unanimous expression of approval not only from Mr. Larsen's colleagues, but also from everyone attending the demonstration, with exception of Mr. Maglie, of course, and his relatively few Brooklyn colleagues.
>
> In conclusion, Mr. Larsen seems through this demonstration to have elimi-

POINT-BURYING PERCY

. . . a real time-lapse expert who won't pitch his point to you until the bottom of page 2.

And when he does, he usually bogs down with qualifications, covering most of his statements with one exception after another.

The truckload of background you wade through to his point is his loyalty to "advanced expository (or research) writing." Anything less might be unprofessional.



SCS sketch

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nated every limiting factor between himself and the first perfect game in World Series history . . .

Of course, our scientist would write on at some length to complete his article. But how many readers would stay with him?

Is this fantasy too harsh, the contrast too extreme? Perhaps. But before you judge, attend an agricultural science convention and sit through some papers. T. S. Matthews was right, in my opinion, when he wrote in the *Atlantic Monthly*:

> In less than two generations science has become untranslatable . . . the public, official view of science is one of untiring hope and faith. In private, however, there is scepticism and doubt, and not just among illiterate peasants, either.

WHY TWO FACES?

During the recent USDA centennial, we heard much about our land-grant system of universities being "the most democratic system of higher education yet devised."

If it is so democratic, what happens to the language of that farmboy between the morning he leaves home for his freshman year and the afternoon he stands before a "society" of fellow scientists to report on some "special study?" Listen:

> The correlations developed and reported by Brown were analyzed and appeared, according to our analysis and interpretation, to contain important inconsistencies, a diverse opinion which we reached through these reasons . . .

There he is writing for "the colleagues." But when he faces Joe Smith up at Smith's Crossroads, he wears another mask. Listen:

> We think Brown's measurements are wrong because . . .

That's all he said in the first place. If it's good enough for Joe Smith, why isn't it good enough for Dr. Percival Writer? Look at the reading or listening time it would save Dr. Writer and *all* "the colleagues." Connecticut Station Editor Bruce Miner once advised this:

> Of course, we are not always to explain or translate science in words used by a 13-year-old. But the plain fact is this: ponderous prose is as difficult for the Ph.D. as for the 13-year-old. It wastes time and it conveys ideas vaguely, if at all, except for one crystal-clear revelation shining through the murk: the author really doesn't know what he wants to say or how to say it.

The way you express yourself or do not express yourself will penetrate the reader's mind more thoroughly, more permanently than all the charts and tables you can pile on top of your report to disguise the fact that you cannot write.

There is no greater discipline than the human mind searching for words that will democratize an "exclusive" subject into a message us average readers can understand and use!

NO VIRGIN "i's" OR "t's"

Many a scientific fact has washed down the stream of technical jargon undiscovered by the public until years after the author's death. Then it has been dug up and made to look brilliantly original by some one with the imagination to put it into words that people can use.

Most people have quoted Benjamin Franklin's statement, "Early to bed, early to rise, makes a man healthy, wealthy, and wise." But few realize he did not create it. He borrowed it from a proverb written in 1598, a thing called "A Health to the Gentle Profession of Servingmen," which said, "That he may be healthy, happy, and wise, let him rise early."

But look what Franklin did to it! His way with words made it live and become his.

Don't kid yourself about virgin "i's" and "t's." There ain't any—and haven't been any since Adam and Eve used the first two in their discussion of the fruit she was not to touch, but did.

Every idea, improvement, or discovery has grown out of previously known ideas, welding another link (or sometimes just part of a link) to the chain of developments reaching back and back to fruit-hungry Eve.

For example, we hear much today about cutting down on unit cost of production. The idea of insuring profits by getting more efficient yields from fewer and fewer acres flows like a fresh new idea. But listen:

"We are producing too much now. Why use fertilizers and still further increase production?"

Statements like this are frequently made in meetings, and the farmers who believe in this doctrine are generally those who are crying the loudest about hard times. My answer to these men is, "All right. Let's sell our best cows because they are producing too much milk. Let's abandon our best land and work only the poorer fields. We can very quickly cut down production in this manner. We'll have less milk to haul to market and fewer bushels of produce to sell. But will this result in greater profits?"

The folly of such a procedure is self-apparent. Profit must be figured on a cost-plus basis, and it is only by cutting down the unit cost of production that we may be able to operate at a profit. There is a uniform overhead cost in keeping cows, tilling land, and raising crops. The increased production from higher producing cows in the herd, the increased production resulting from proper feeding, both tend toward lower unit production cost and make for greater profit.

And so it is with the production of our crops. We had better till a few acres of good land at a profit than waste our energies on a large acreage of poor land and produce our crops at a loss. In fact, fertilizers applied to good land more frequently will return a profit than fertilizers applied on very poor land. For what shall it profit a man, though he have the finest buildings, machinery, livestock, etc., to allow the fertility of his soil to run down.

Soil fertility is the key to profitable farming, but our soils are not everlasting in their stores of plant food no matter how fertile to start with. And so farmers must feed their crops extra rations of well-balanced plant foods if they are to continue to till these acres profitably.

Wisconsin's C. J. Chapman said that *in 1928*, in the January issue of this magazine.

WALK TO A GOOD ARTICLE

Each scientific writer has two aims: to present his facts as exactly as possible and to write in such a way that he cannot be challenged—he hopes! That's a tall order. But he doesn't have to be stuffy doing it.

An agricultural scientist once wrote a report in which a sentence like this occurred: "The surveyors walked across the field taking soil samples." When the manuscript was sent around to be checked, a colleague wrote: "I don't like that sentence. It's not technical enough. Can't we say, 'The surveyors made a traverse . . .'"

Why *traverse* when you can *walk*?

What is your road to a strong article? Three simple steps: (1) planning your article, (2) writing your article, (3) polishing your article.

Simple?

Well, let's see.

Planning Your Article

First, plan WHAT you want to say

Why plan an article? For the same reason you plan a house. To prevent wasted energy, thoughts, and materials. To insure good results.

Planning or pre-writing may be tougher than you think. Most of you report research results. You have a mass of data and conclusions on hand. Where do you begin? What is essential? What can you omit? What should you start with? How do you end your article?

So—before you can write an article you must plan it. Some experts suggest steps like these:

1 Carve your peg. Think! In a single sentence state exactly what you want to write about. This is the peg around which your whole article can be built. It gets you started.

2 Build your title. Study your peg carefully. Does it stimulate a clear title? It should. Not a formal, self-conscious pile of technical jargon. But a three or four-word unit fueled by a strong verb. Don't be inhibited by the number of words, if you can build an interest-catcher out of more words. A potent question can be an effective title. Give it action.

3 Fire at will. Jot down every topic that comes to mind when you think of the subject you plan to write about—every topic that will consume a paragraph or more in the finished article. Rapidly. In any order. Don't worry about relative importance of points. Get them down while your thoughts are hot. Sort later. Flush your mind fast.

4 Hit your bullseye. Among all the topics you just got on paper, a few will stand out. Choose them on the basis of some important distinction. Phrase them carefully. Put them on separate sheets or large cards. Put cards in order of importance. Number them. Have space for under thoughts.

5 Spread your shots. Many of the remaining topics on your original list will relate to one or more of your main bullseyes. Put them in descending importance under the main topics they best fit. Develop these subordinate topics as full sentences. You might write a topic per card, sorting the cards so your sentences have a logical order.

Such steps will give you a pretty good idea of what you are going to write.

Then, plan HOW to say it

It's one thing to decide what your house will contain—four bedrooms, two baths, etc.—but another thing to decide how they should be arranged for best efficiency and convenience.

The same thing applies to your article—how can you arrange it to interest your readers as well as it informs them?

FROZEN-PHRASE FREDDY

SCS sketch

. . . a walking dictionary frozen to *proper* scientific phrases.

You'll never catch him thawing out and writing about fertilizer "stretching moisture for corn plants."

To him, fertilizer "stimulates more root exploration of the soil resulting in soil water use at higher tensions and greater depths."

In all writing, you must fit different pieces of your manuscripts into a pattern clear to your reader. Writing experts at USDA workshops mention several existing patterns:

1 **The chronological approach.** You begin with the first or earliest important date and build into the second, third, fourth, etc. A "History of the Agronomy Society" might take this approach.

2 **The chiseling-out approach.** Your plan is deductive here. In your opening paragraph or two you name the major topics to be developed. You then write about these topics in the order named. You save the reader time by citing the major points in the beginning. A very readable approach if the writer sticks to it.

3 **The suspense-building approach.** Your plan is inductive here. You present your major topics one at a time. Unlike No. 2, you don't list the major topics early in the article nor summarize what is to come. You can build some suspense with this approach, steadily diminishing with each succeeding point.

4 **The easy-to-hard approach.** Your problem here is to work with details that are both easy and hard to understand in the same manuscript. You can begin with the simple or easy-to-understand details and work out to the most difficult. You must judge what is easy and what is hard.

5 The least-to-most-important approach. You begin with the least important details and write toward the most important. You can work toward a strong climax with this approach. You can also build a sense of strong forward motion. Again, you must judge what is least and most important.

These are a few patterns recommended by experts. But personally I would like to see a scientist write about his findings much like a skilled journalist reports a feature news event:

Begin your article with a single strong sentence: a real interest-catcher, the peg, your big point.

Then—move (fast) into 7 or 8 short paragraphs that tell your story in a nutshell, a nutshell crackling with action.

Then—set a leisurely pace to expand on these action paragraphs: to explain your materials and methods, what you used and how you did the work; to describe your experiments and results in logical order; to clarify the meanings and implications of your results; and to indicate possible future developments.

Then—summarize with a potent peg-end sentence or short paragraph.

Writing Your Article

After you have planned *what* you want to write and *how* you want to arrange it, the job begins. The job of *writing!*

There the science of organization gives way to the art of creation. Planning your article was probably a pleasure: choosing your data, organizing it, conferring with colleagues, etc.

But writing is another horse! Only *you* can write—or not write. It is the loneliest job in the world—especially for the guy whose wits shine in committee-gear with similar-field colleagues but grow dim over a blank piece of paper.

As Editor Bruce Miner once said, "The man who finds it *easy* to write clearly, and to help others use the written word effectively, is probably either young or a genius—perhaps both. For the most part the approach is unscientific, and it will always be so."

When we receive an article for use in our *Better Crops* magazine, I look for five things (in this order):

1 The lead sentence: what it says and how it says it.

2 The title: how fast its meaning strikes me and how simply it is worded, for interest and identity.

3 The paragraphs: how long and loaded or how short and open, what breathing room appears around them, what white space.

4 The sub-heads: how much logic to their sequence, how much story they tell, how catchy their wording.

LONG-WORD LARRY

. . . a pompous one, he is, who writes more to impress than to express.

He strings syllables together like beads, never reporting the *lack* of something but always the *unavailability* of it.

You'll never see him *face* a problem when he can *confront* it. He doesn't believe in *change* but if you want to make a little *modification*, he's with you.

He doesn't know or doesn't stop to remember the key to most great utterances left to man—the Bible, the Magna Charta, the Declaration of Independence, the Gettysburg Address, etc.—largely simple familiar words.

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5 Content character: how obvious are its major points to the scanner, the guy who races through sub-heads and a few paragraph leads hunting for something that interests him.

How do you write an article that will interest your reader while it informs him? Many experts have many ideas on how to do this. But there are no fool-proof rules, only principles you can learn to practice. Here are some:

USE FAMILIAR WORDS

Agronomists write about good soil fertility programs: the right *nutrients* in the right place at the right time for the plant's demands.

Good writing is like a good soil fertility program: the right *words* in the right place at the right time for the reader's understanding.

Do you choose words to impress or express, to display your knowledge or to share your ideas? As a plain general journalist (whatever that is), I do not expect an agronomist to pretend the complex is simple. But I seriously suspect many writers (the young especially) make the simple appear complex in order to appear professional themselves.

The real professional is simple. Names like Liberty Hyde Bailey, Hugh Hammond Bennett, Emil Truog, Firman Bear, George Scarseth stand out in agricultural writing—and will be remembered. Why? Because they

used familiar words and knew how to put them together. Listen to Dr. Bear nearly a quarter of a century ago:

> The farmers of the United States have dug their way down into the subsoil faster than those of any other nation that ever existed. Our engineers have invented bigger and better plows and tractors to pull them.
>
> But one of the most significant developments of recent times has been the rapidly growing realization that we plow too much. Too large a percentage of our land is being devoted to soil-destroying cultivated crops, and too little to the soil-saving sod crops.

Can you imagine how the scientist in the dream on the plane would have written about this plowing problem?

The confident writer knows each word can have two kinds of meaning: the dictionary meaning (denotation) and the personal-view meaning (connotation) or what the reader "sees" in the word.

What does the word *yarn* mean to you—a story or a thread? An SCS editorial debate once focused on the word *appreciate*. To one it meant *realize*. To another it meant *to have gratitude*. Both meanings are OK. But how does your reader see it?

The first sign of a sophomore is flowery language—whether he's writing about an alfalfa project in the foothills of Virginia or about Darwin's theory on monkeys and men.

> Why write about **confronting** problems when you can **face** them? Why **proceed on the assumption** when you can just **assume?** Why mention the **unavailability** of something when you can say the **lack** of it?

Too many scientists string syllables together like beads, loading their sentences with words of too many affixes. Fog from affixes comes when you change verbs into nouns and adjectives—whether it's a prefix in front of your base word or a suffix on the end of your word.

> **For example:** good old **use** becomes **utilization; equal** becomes **equivalent; develop** becomes **development; change** becomes **modification; aim** becomes **objective; apply** becomes **application; show** becomes **demonstration; meet** becomes **encounter; delay** becomes **procrastinate.**

Don't cut out an important technical word if you have to use 20 to 30 so-called simple words to replace it. Just use it in a way that suggests its meaning without insulting your reader. Surround your technical word with what your reader knows.

Look how Emil Truog (a world soils authority) explained why potassium helps prevent corn lodging:

> There is good reason why a high level of available potassium is all-important. The structural material of the cornstalk, exterior wall and interior pith, consists largely of a carbohydrate called cellulose. The starting process in the manufacture of cellulose by a plant is the manufacture of starch. It is well known that a satisfactory rate of starch manufactured by a plant depends on a good supply of potassium in the plant.
>
> Thus, it is evident why a high level of available soil potassium is needed

To Page 30

H. B. MANN

J. FIELDING REED

REED SUCCEEDS MANN AS POTASH INSTITUTE AND FOUNDATION PRESIDENT

Dr. J. Fielding Reed, nationally known plant food industry scientist, succeeds Dr. H. B. Mann as president of the American Potash Institute and The Foundation for International Potash Research January 1, it was announced by the Board of Directors of both organizations.

Reed is the third Institute head since it was formed in 1935 by the nation's potash industry to support official scientific research and education in soil fertility.

Before becoming executive vice president a year ago, he had directed Institute activities in 11 southern states since 1949.

Retiring President Mann will live in his native Hyde County, North Carolina, after January 1. He left there nearly 50 years ago to train in soil science at N.C. State College and Cornell University, serving half his career as a State Experiment Station scientist, half as an industrial scientist building technical teamwork between official agriculture and industry.

Under his leadership, the Institute supported many soil fertility milestones at the invitation of official agriculture. He saw soil and plant testing become an accepted science, fertilizer placement methods improved for efficient use of higher analysis fertilizers, and the principle of plant food removal by major crop yields more widely taught.

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of this research and education organization, Dr. Mann saw it grow to include the American Potash and Chemical Corporation, Duval Corporation, Potash Company of America, Southwest Potash Corporation, Texas Gulf Sulphur Company, and United States Borax and Chemical Corporation.

Never Really Left

When he returns to the home in which he was born on Pamlico Sound, the people will still call him "Skin," not because he is still lean, but because he is basically the same person who left there nearly a half century ago.

In fact, Harvey Mann has never left Hyde County for too long—not while earning two degrees at N. C. State and one at Cornell, not while serving half his career as an Experiment Station scientist and half as an industrial scientist building technical teamwork between ofcial agriculture and industry, not even while entertaining foreign scientists at Atlanta's Athletic Club and Washington's Cosmos Club.

Although Hyde County is not as well known as Texas, H. B. Mann's devotion to it resembles a Texan's outlook. It will creep into about every conversation he has. Ask anyone in the nation's chemical plant food industry.

They first called him "Skin."

By S. WINGATE MARTIN

ent Reed earned three scientific degrees in chemnd chemistry from Louisiana State University. In efeller Foundation named him a post-doctorate University.

he American Potash Institute as southern director ved on the staffs of Louisiana State University ollege where his work on peanut fertilization and es received national attention.

ive in professional societies for many years, servnt of the American Association for Advancement esident of the Southern Section of the American my.

med him a Fellow, and the Agronomy Society 1962 Agronomic Service Award for "outstanding gronomic research, education, and service."

d Dr. Reed's role as the only industry representanal Soil Test Work Group which standardized ing techniques. It also mentioned his close work fied fertility programs and his firsthand studies ıditions in Europe, Asia, and Latin America.

ed now reside at 5613 McLean Drive, Bethesda,

THE END

This loyalty to his rural heritage has kept Dr. Mann's sights firmly fixed on his Potash Institute's philosophy expressed by the first president, Dr. J. W. Turrentine:

"The agricultural usage of potash must be increased only *on a basis that is sound and profitable to the farmer."*

Twenty-nine years and two presidents later, H. B. Mann could hand the Institute reins to Dr. J. Fielding Reed on January 1, 1964 with this advice:

When anyone reminds you that potash usage has increased 760% in the past 30 years, that the average mixed fertilizer today contains 118% more potash than it did in 1935, don't forget who did it—the men in official agriculture, often the unsung scientist working in the state experiment station to uncover honest needs for potash in crop production. Don't forget."

Reed will not likely forget since he was an Experiment Station scientist at Louisiana State University and N. C. State before heading the Potash Institute's southern staff in 1949.

No Take-Me-Serious Scientist

Although Harvey Mann has been cited in many Who's Who directories over the years—from America's Young Men and Chemical Who's Who to American Men of Science and Who's Who in America—he has never taken himself seriously.

Four years ago, he directed his Institute editors not to issue any press releases on the citation America's highest body of official soils scientists extended him.

"Why not?" we asked.

"It's not that important," he answered.

"You mean a citation from the American Society of Agronomy is not important enough to report?"

"Oh no," he replied quickly, "such a citation is a very high honor for any crops and soils worker. But I mean my role is of no interest outside our own group."

We did not agree with him, but we did not issue any release.

When asked to state his hobby for a special directory of distinguished North Carolinians recently, Dr. Mann listed one item: "sitting in my rocking chair on my porch."

Between the rockings, however, he managed to squeeze in 40 years of intensive work on soil fertility and plant nutrition.

And in the process he was named a Fellow of both the American Association for the Advancement of Science and the American Society of Agronomy, delegate to the Third International Soil Congress at Oxford University, a member of many professional fraternities, chairman of various fertilizer committees in such bodies as the Southern Agricultural Workers Association, etc.

While carving his career, he has maintained a loyal interest in his alma mater, N. C. State College: serving on its General Alumni Association Board of Directors, heading the Association's Atlanta group, and currently serving as president of the 1920 class.

No membership has ever meant as much to Mann as the seat he once held on the University of North Carolina Board of Trustees: an important body in a state long devoted to improving and expanding higher education.

He never mentions this post without recalling the role UNC Trustee Hugh Harris of Oriental played in getting him a seat on the coveted Board.

In A Colleague-Conscious World

Such credentials are important to a scientist. In his world, success (from salary to position) is usually measured by the quantity of academic degrees, the quantity of published articles, and the quantity of professional memberships he can add to some research.

Mann is no exception. He reached the leadership of a national and international research organization through this route.

But his personal approach to a successful career in agricultural science is exceptional, I believe.

By that I mean his relatively small concern with appearances, his refusal to try to impress anyone with his knowledge or his credentials, his almost naive candor about shortcomings.

He managed to build and maintain the respect of fellow soils scientists around the world without wearing a formal scientific mantle.

Some opponents, the more formal colleagues, have wondered how—even in spite of the degrees, the 35 federal and state publications on early original research, the memberships in everything from Washington's professionally elite Cosmos Club to the Soil Science Society of America.

Perhaps his candor is the answer: mental honesty couched in a country-cured language that makes his ideas sound simple and sincere to the human ear.

Scientists Amazed—Then Relaxed

I have seen visiting scientists—from Holland, Japan, England, Germany, Israel, France—first amazed, then amused, then completely relaxed and convinced by the down-home "Hoide County" (Hyde County) accent, intentionally slaying the King's English to get to the meat of a word-fat idea proposed around a conference table.

His candor creeps out in everything he does and says. When I asked him why he chose agriculture for a career, he replied typically, "I went to State College because I thought it'd be easier and I thought I wanted to be a big shot farmer.

"I had visions of learning animal husbandry and returning to Hyde County to ride around on a fine horse overseeing my farms.

"The ag courses came out all right. But when I got back to Hyde in 1920, farming didn't look so good. Prices were bad. And my father said I'd better take the offer Prof. Williams had written me about—to be a soils specialist at State College."

Mann took to soils. By 1925, he had earned an M. S. And by 1927, Barrett and Company, major nitrogen producers, invited the young Assistant Agronomist to join their staff.

When he told his superiors about the Barrett offer, he said he preferred a year's leave of absence to get a doctorate. They granted it.

Chasing A Fast Ph.D.

His description of how he worked his way up the East Coast in quest of a fast Ph.D. is another example of his special brand of candor.

"I had a year—1927-28—to do it. I stopped first at Maryland and told the professor of soils I wanted to get a doctorate in a hurry—in a year. He said it wasn't done that way.

"I went on to Rutgers, to Prof. Blair, and told him the same thing. He looked me over slowly, through the eyes of a serious-minded sci-

entist. He was real serious. And he said I didn't have the right attitude.

"So, I went on to Cornell. I told Professor Bizzell there the same story. I also told him I had stopped at Maryland and Rutgers and had received no encouragement. I quoted what Prof. Blair had said about my wrong attitude.

"Professor Bizzell listened me out, quietly. Then he said I was in too big a rush. They didn't do it that way. He could understand the views expressed at Maryland and Rutgers.

"I then asked him if he would just let me try to cram it all in one year at Cornell. He sat a long time staring at me, it felt like, then doodled something on paper.

"When he turned back to me, he said he would outline a program I could try but it would be a miracle if I completed it.

"Being half scientist and half farmer, I don't go in too much for miracles. But I managed to squeeze enough hours out of each day to complete the course work for my doctorate to Cornell's satisfaction in that year. When I left, I had only the dissertation to finish.

"It wasn't easy. And I mention it only to point out to young people coming along today that when you shoot straight from the shoulder to folks who control your future, they'll give you the chance you deserve—but when you hedge, don't expect much in the end."

Back at North Carolina, he served six more years with the Agricultural Experiment Station, until 1936, before making the decision that would mold the last half of his career.

A Land-Grant Symbol

Mann symbolizes the agricultural scientist produced by America's system of land-grant universities (such as N. C. State) during the first third of this century: sound but insistently practical, suspicious of rhetoric but dedicated to clarity, searching for scientific results the farmer could *use* to improve his lot.

He has never been the basic or fundamental scientist. Theory holds him only briefly. He grows impatient if the light of practical application doesn't soon shine through.

Yet, he early did original work in North Carolina: on more concentrated fertilizers, on the influence of mineral supplements, on the relation of fertilizer placement to crop stand, growth, and production. But they were not tests for tests sake. They were aimed toward profitable fertility practices for the farmer.

J. J. Skinner, long a U. S. Department of Agriculture soils scientist, influenced Mann's scientific career. After developing the paper he was invited to deliver at an Oxford University conference, he turned to Skinner for advice. He often turned to Skinner.

The former Research Coordinator of the U. S. Department of Agriculture, Dr. R. Y. Winters, once credited Dr. Mann's controlled studies on peanut fertilization with "changing the practice of supplying lime to North Carolina peanuts."

He also described Mann's "promotion of plant nutritional research in agricultural colleges," while Southern Director of Potash Institute, as "generous and discreet, in strict accordance with fertilizer recommendations of the State Experiment Stations and U. S. Department of Agriculture."

Perhaps Winters' most important point, especially to an industrial scientist, was the conclusion that "Mann maintained respect and confidence of State and Federal officials alike."

"Wanted . . . No College Graduate"

Most young Ph.D.'s entering agricultural industry today accept the mutual respect between themselves and Experiment Station scientists without question. It wasn't always that way.

Not too many years ago, official agricultural and industry seldom saw eye to eye. University scientists sometimes suspected industry of promoting more plant nutrients than needed or where not needed. In turn, industrial specialists felt university scientists worked in an ivory tower too removed from everyday-farmer needs.

A Mann associate remembers one fertilizer manufacturer advertising for a field representative this way: "Wanted, competent field representative, but no college graduate." Industry felt "laboratory-dwellers" were loafers—wrongly, of course.

At one point, feeling ran so high some industry groups talked about "suing" certain institutions for what they thought were unwarranted claims against certain plant foods. Talk is all that happened, of course, and all that would have happened.

But the point is clear: official state and federal scientists, dedicated to recommending the best possible fertility practices for the farmer, rarely sought the views of an industry specialist.

Today the picture is different. Official agriculture invites industry scientists to participate in major university roundtables and scientific meetings, often elects them to top posts in professional groups.

In fact, some official specialists who wouldn't drink a cup of coffee with an industrial specialist years ago are now industry scientists themselves.

"Not Interested—But Have a Seat"

Perhaps the strongest example of Mann's country-style candor—and independence—was revealed early to the original president of the Potash Institute, J. W. Turrentine.

He called Mann from Washington in 1936 and said he wanted "to come down to N. C. State College and talk about a matter of mutual interest."

After he hung up, Mann remembered he had planned a deer hunting trip for the week-end Turrentine mentioned. He was to go with a close friend, Frank Poole, then an N. C. State plant pathologist and later president of Clemson College.

He weighed the deer against the potash. The deer won. He wrote Dr. Turrentine a thank-you note for the call and his regrets for having a previous engagement he overlooked on the phone.

The deer ran well in the sandhills of Moore County that week-end. And Harvey Mann had virtually forgotten the Washington call when a little man with a sharp eye stood in the door of his N. C. State office the next Wednesday.

True to his reputation, the stranger did not waste words: "I am Dr. Turrentine of the Potash Institute and I wondered if you are interested in joining our southern staff."

Mann, who would make a great model for some shoe manufacturer, did not shift his feet from his desk

or his seat from his chair. He replied simply, "No, suh, I'm not interested. But have a seat Dr. Turrentine."

The world-known potash chemist sat down. He was at home talking potash because he had revolutionized the potash industry by inventing a process for vacuum cooling and crystallizing potash salts.

Suddenly, in the middle of their conversation, he quoted a starting salary to Mann.

Mann's feet whirled off the desk, barely missing Dr. Turrentine's head, as he said, "I'll take that job."

". . . But No Speeches"

And today Harvey Mann says, "I took it because no college around could approach the economic potential he offered me. To say I took it out of some sense of challenge or duty would be hypocrisy for me. I took it because he would pay me much better than a university. And I knew of his tremendous reputation for scientific objectivity.

"Before he left that day, I told Turrentine I would never be able to make a speech in the job. He would have to understand that. The week before I had tried to make a speech on the same platform with Frank Porter Graham and on the way home to Hyde County a few days later, I decided I would never again try to speak in public—that I was out of my class in that line."

Turrentine told Mann he would have to make some speeches and they could work that out.

They worked it out. Mann has never made a speech while guiding the Potash Institute to its present stage of scientific service.

Early Condescension: Head-On

Not long after joining the Institute, Mann ran head-on into the early attitude official agriculture held for industry.

He had hardly removed his hat to visit with Dr. Frapps at Texas A & M when the veteran soils scientist said, "Well, Mann, I'm sorry to see you've succumbed to the lure of commercial work. I thought you had a bright future in official agriculture."

He implied he thought Mann had sold his birthright, an insinuation that hung heavy on the new potash scientist as he drove back to Atlanta.

Before he left N. C. State, Mann's superiors had offered him a year's leave of absence to try the job. If it didn't work out, he could return to his old post.

The Frapps comment made him think long about that leave. But by the sixth month, he had seen enough of the Institute at work to ask his former boss to cancel the leave.

He had learned what the famed chemistry writer, Edwin E. Slosson, meant when he said "statements issued by the potash industry were found so accurate by government specialists" that they used them as part of their recommendations.

Some Major Milestones

Under Mann's leadership, the Institute supported many soil fertility milestones at the invitation of official agriculture.

He saw soil and plant testing developed into an accepted science, fertilizer placement methods improved to use more concentrated fertilizers, and the principles of plant food removal by major crop yields more widely taught.

He saw the Institute invest hundreds of thousands of dollars into research grants at agricultural institutions in 40 states and Canada: uncovering more efficient ways to use plant food, enabling promising young men to prepare for important careers in science and industry.

He saw official agriculture invite his Institute to help sponsor thousands of field demonstrations. They covered everything from high-nitrogen treated pastures removing large amounts of soil minerals to proper soil fertility preventing "down corn" or lodging.

At the same time, he saw the Institute produce 21 movies shown 83,000 times to more than 5,000,000 people.

He saw agricultural leaders request nearly 11,000,000 copies of 1,140 different article-reprints written by official specialists for the Institute magazine—as well as 1,000 slide sets annually (on current average) from seven educational sets, 350,000 wall posters, and more than 2,500,000 regional Potash Newsletters.

And Some Rare Bosses

But his sharpest memory will probably focus on the Institute Board of Directors—his bosses—a team of 10 men who have long agreed that scientific proof of potash need is sound business.

"I'll never forget the freedom they have always given me, all of us, and the respect they always showed. That means much to a scientist," Dr. Mann concluded.

"They are a strong group of businessmen. They have permitted the scientific truth, favorable and unfavorable, about their product to be searched out through us. And the truth has won. I knew it would."

Mann shifted his feet from one side of his desk top to another. He chuckled, "Sounds like soft soap, don't it, Martin. Well, it isn't."

And it wasn't—not from a man of his candor.

But Not Grant

One night years ago in California, Mann and the local Institute agronomist rode into a coast town, tired after a day's tour of some major orchards. The agronomist chose the best hotel in town for "the boss."

Mann was ready for a hot shower, a cool drink, a good meal, and rest. As he straightened up out of the car, he stared long at the hotel name blinking belligerently at him: "Ulysses Grant Hotel."

He jerked his head toward his associate and said, "No, suh, I ain't staying here. With General Lee, yes, but not with that man."

The Hyde County scientist delights in projecting a down-to-earth, country-boy humor: southern style. He plays the role to the hilt. The Californian took this reaction as such humor. But they did not spend the night in that hotel.

THE END

The TEAM For Success

Liberal or continuous applications of lime and potash are essential for high alfalfa yields on northern Minnesota soils.

Curtis Overdahl, University of Minnesota extension soils specialist, reports "continued topdressing with high potash rates, heavy manure applications, and adequate liming are the practices responsible for the abundant growths of alfalfa."

Overdahl added that heavy potash treatments have increased the concentrations of this essential element in the root zone.

Soil samples taken in treated fields show properly administered potash treatments have moved potassium to a depth of 18 inches with little, if any, of it being lost into the water table.

Farmers in the Grand Rapids area who have been giving their fields similar high potash and lime treatments also reported good alfalfa yields this year.

Overdahl pointed out that the liberal liming rates have increased the soil pH in the area to about 7.0 which compares very well with the 6.5 minimum requirement for growing alfalfa. *Minnesota News*

GUIDES TO FORCEFUL WRITING

Many bookstores feature books and manuals telling people how to read more rapidly and write more clearly. Out of the marshlands, I stumble to recommend one little book to any scientist who wants to write with force. In fact, it was called "the little book" on the Cornell campus for many years.

It is The Elements of Style by William Strunk, Jr., published by The Macmillan Company.

Whether you write about soils or peoples, the late Prof. Strunk gives you in 70 pocket-size pages the basic tools to develop a style that readers will read: a clear, brief, bold book, full of principles that work and examples of them *at work*.

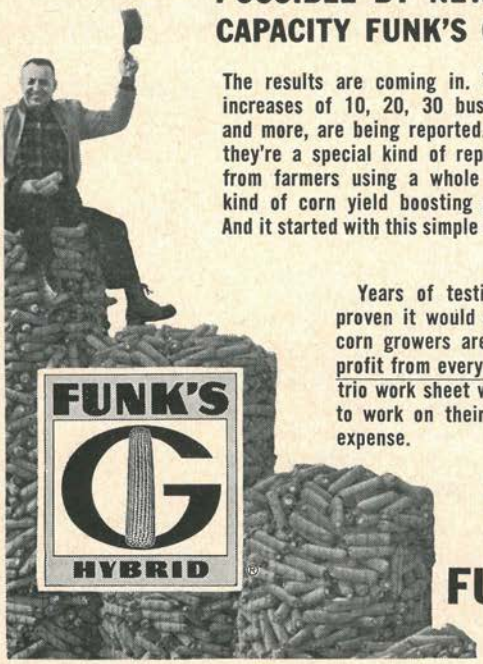
Any scientist could use it to learn to write. If nothing else, it will teach you how to come to the point quickly—and with a minimum of pomposity.

Some other suggestions are Robert Gunning's Technique of Clear Writing, McGraw-Hill; Rudolph Flesch's Art of Readable Writing, Harper and Brothers; Amy Cowings' USDA guide, Writing Words That Work; the ARS-USDA Workshop Series on Writing; and the always clear SCS releases on writing techniques.

s.m., editor

The BIG Opportunity in Corn Farming

TRIO IDEA CATCHING ON RAPIDLY. THREE HIGH PROFIT PRACTICES BEING USED ON INCREASING NUMBER OF FARMS. YIELDS UP 20 PERCENT AND MORE THIS YEAR. MADE POSSIBLE BY NEW GROUP OF EXTRA HIGH CAPACITY FUNK'S G-HYBRIDS.*



The results are coming in. Yield increases of 10, 20, 30 bushels, and more, are being reported. But they're a special kind of report—from farmers using a whole new kind of corn yield boosting plan. And it started with this simple idea:

1. Use High Capacity Funk's G-Hybrids.
2. Grow enough extra plants to produce a thousand or so extra ears for each 10 bushel per acre increase expected.
3. Put on enough additional fertilizer to feed these extra plants.

Years of testing this idea under many conditions had proven it would work. And it has! This year, thousands of corn growers are harvesting an important extra margin of profit from every acre. Funk's-G dealers everywhere have the trio work sheet which tells corn raisers how to put the idea to work on their farms with the least effort and smallest expense.

It's the BIG opportunity in corn farming!

THE PRODUCERS OF FUNK'S G-HYBRIDS

*Funk's G-Hybrid is the registered trademark of Funk Bros. Seed Co., Bloomington, Illinois

SENTENCE-STRETCHING SAM

. . . a real paragraph packer who chokes you with long sentences.

He throws "which clauses" and all attachments at you with wild abandon.

He says, "The soil fertility of this field has been tested, *but* the soil condition in the lower pasture is an unknown factor *which* may account for the lower yields."

He could say: "We've soil tested this field but not the lower one. Inadequate fertility may be limiting the lower field."

From Page 19

to produce cellulose, the structural material needed for strong cornstalks that resist lodging and stalk break of corn. If your soil does not have a good supply of available potassium, you should fertilize with this element.

He frames such terms as *pith, carbohydrate, cellulose* in statements that make their function clear to the average reader—without sounding unprofessional to "the colleagues."

Dump words that do not work: the write-arounds or word-fat phrases that creep into technical writing. For example:

Use **like** instead of **along the line of**
always instead of **at all times**
when instead of **at such times**
now instead of **at the present time**
if instead of **in the event of**
before instead of **prior to the start of**
on instead of **in connection with**
about instead of **with regard to or reference to**
whether instead of **the question as to whether**
hastily instead of **in a hasty manner**
this subject instead of **this is a subject that**
no doubt instead of **there is no doubt but that**
light brown instead of **light brown in color**

When you weed out needless words, you turn more to active verbs, lean less on the passive crutch. You will say this *less* often: *"This treatment resulted in a 100 per cent increase per acre in the farmer's corn yield."* You will say this *more* often: *"This treatment doubled the farmer's corn yield."* Seven words to do the work of fifteen!

WRITE CLEAR SENTENCES

What is a clear sentence: usually a group of words with *one* idea. When you limit each sentence to one thought, you usually write short sentences. The short sentence is the clearest sentence—usually. A good average ranges between 15 and 20 words.

A long sentence will be clear if you build it around one idea or a series of *related* ideas; just keep the relationship between your words clear, as with a series of "where" clauses. For example:

> Soil test campaigns pay off where farmers use the official recommendations, where county workers pool their skills, where dealers stock the recommended grades, and where townspeople identify with the farmer's economic potential.

But don't let a lot of "which" clauses and prepositional phrases pile up on you.

Watch your "which" clause: when it merely *comments*, make it into the next sentence; when it *defines* or helps your sentence make sense, keep it in.

> **FROM commenting clause:** A good way to place fertilizer, which many farmers now practice and find profitable, is to band it two inches to the side and below the seed.
>
> **TO two sentences:** A good way to place fertilizer is to band it two inches to the side and below the seed. Many farmers do this profitably.
>
> **AS a defining clause:** A fertilizer placement method which is safe and efficient is the band two inches to the side and below the seed.

Some writers strengthen their narrative by breaking a compound sentence in two, starting the second sentence with *and* or *but*.

> **From this:** They learned that many areas of county leadership can promote the county's soil resources, but in the long run the action must come from the people.
>
> **To this:** They learned many areas of county leadership can promote the county's soil resources. But action must come through the people.

Watch the build of your sentence. Keep its action parallel when you dive into a series:

> **Don't do this:** Work of the county agent on the soil fertility campaign included presentation of slides, writing newspaper columns, radio appearances, and mailing newsletters.
>
> **Do this:** The county agent did many things to make the soil fertility campaign go: showed color slides, wrote newspaper features, spoke on radio, and mailed newsletters.

Some scientific writers have the idea that "tight" writing means as many ideas as possible pressed into each sentence. The fewer the sentences the briefer the article, they must reason, hang the clarity or interest.

Look at this tight sample Tom Dale of SCS presented several years ago:

> The first step in planning any type of run-off-disposal system for a field

AIMLESS ARTHUR

. . . a scatter-shot whose writing smacks of scatterbrain.

You don't wade far into his swamp before you realize he didn't plan *what* he wanted to say—or *how* to say it.

In all the fog, you begin to feel sorry for a man who works so hard to make words think for him when words are only tools to tell his thoughts.

---

or farm is to make a physical inspection of the adjacent areas as well as the area under consideration and note the topographical features such as drains, laterals, ridges, slopes, and gullies and any other features that may influence the location of drainage-ways.

As Tom said, "That may be a first step, but it looks like a cross-country hike to me."

That writer crammed a dozen ideas into one sentence. He may have saved some words but he lost many readers.

BUILD SHORT PARAGRAPHS

You scientists say plant roots need "adequate aeration"—breathing space in the soil—to get oxygen for healthy growth.

The same thing applies to your paragraphs in writing. Aerate them. Keep them short so your writing will have many open spaces. Long, unbroken paragraphs discourage readers. Such copy looks dull, heavy, uninviting.

Limit the number of ideas per paragraph. You might average 35 to 60 words—2 to 4 sentences—per paragraph. In a journal with 2-inch columns like *Better Crops,* a single sentence sometimes makes a paragraph. For that matter, one word can give your paragraph break.

Why?

Because the paragraph break is another mechanical tool for teasing your reader along. When you stop your reader and drop his attention to the next line, you let him know you have something new coming up.

And readers like to find out what it is.

MAKE YOUR PEN TALK

When you face a blank sheet of paper, do you start to put on airs? You would never describe your work to a neighbor across the back fence like you write about it for a distant colleague.

Nothing reveals a person more starkly than extreme contrast between his talking and his writing.

If he talks somewhat egg-headishly *and writes* that way, it's natural with him. If he talks "goodern-snuff" and writes much that way, it's natural. But watch for Dr. Writer and Mr. Talker . . .

WHO WILL WRITE: Since there still remain many imponderables and much confusion about the over-all subject, I would recommend that we not attempt to deal with it in our forthcoming roundtable. The present status of the subject is such that it would be very difficult to develop a strong, positive approach, and it likely would leave the impression that we are very much on the defensive. Possibly it should be mentioned at a lower level of study, but under the circumstances and with the purpose of the special seminar, I would question the wisdom of devoting an entire seminar to it.

WHO WILL SAY: The subject is a hot potato that might put us on the defensive: too many unsolved parts and conflicting views. I suggest we remove it from our next roundtable. But let's fit it into a department study.

What about that first version? Pretty pompous stuff, isn't it? YET—let's not draw the line too strongly. We've all known people who can converse clearly but write so vaguely that even their colleagues stumble through their narrative.

On the other side—according to biographical records—some of the greatest professional writers, brilliant with narrative at the typewriter, have failed as speakers and even as well organized conversationalists.

Do you remember the lively discussion at some roundtable where everyone talked off the record? You were honest, weren't you? You tried to be objective, didn't you? You were precise, weren't you? Why not write like you talked there?

Did you talk there about how "the plant achieved it's growth?" OR did you say "the plant grew?" Did you say that "the spraying of the crop was accomplished?" OR did you say "he sprayed his crop?" Did you say "soil samples were obtained" OR "we took soil samples?" Did you say "it is advisable to" OR "you should . . . ?"

Dig out the last article you wrote. Read one paragraph carefully. Study it. Now *tell* it to your wife. Just the facts there. Ask her to jot down what you say. You'll be surprised at the results: same data, but more personal, live action words, shorter, simpler sentences, *like talk to the reader.*

BACKDOOR BARRY

. . . a human Wonka Wonka bird that flies backwards so he can see where he has been—darn the reader out front.

You'll rarely catch him writing with head-on action (in active voice) like this: "Many newspapers *produced* soil fertility editions."

He backs up to you (in passive voice) like this: "Special soil fertility editions were *produced* by many newspapers."

From: These estimates are not optimistic, for they do not involve the hope that we shall appreciably increase within the next few years the acreages in harvested crops. Neither is it anticipated that there will be much increase in the improvement of pastures.

To: Our estimates are not bright. We see no increase in our harvested crop acreage in the next few years. And we expect little pasture improvement.

From: There is expected to be a considerable increase in consumer demand for fertilizer this spring.

To: Farmers may buy more fertilizer this spring.

What Editor Arthur Brisbane once advised a young writer on a fancy article title is still Grade-A advice for technical writers. The young fellow had written on ancient health and living standards compared with modern standards. He did a good job. But his title was a monstrosity: "Hygienics and Dietetics in Ancient Times."

Arthur Brisbane must have looked at that thing, turned to the writer, and said: "Son, only a few professors will read that. Let's change the title. What about this: 'Pity Poor Moses—He Had No Bathtub'? How's that?" The writer liked it. And his story was read by more than a few professors.

PUT RHYTHM IN YOUR WRITING

Variety, rhythm, emphasis all come out of the same writing pot. When you write to get proper emphasis, rhythm and variety will naturally come. You can get emphasis in four ways:

1 Right position: A key word or phrase is usually more emphatic at the opening or ending of a sentence, not buried in the middle.
Example: American agriculture reflects what the free enterprise system is supposed to reflect—increased efficiency.

2 Repeated words: Repeating a key word does not brand you with a weak vocabulary, but emphasizes the term you want to spotlight.
Example: Cooperation has been the key: cooperation in research to find the need, cooperation in demonstrations to prove the need.

3 Similar build: Expressions of equal content and function (importance) should be outwardly similar. Parallel structure enables your reader to recognize the likeness of content and function.
Example: Early demonstration work taught us two principles: to grow crops under approved conditions on plots adjacent to unfertilized or inadequately fertilized plots for contrast, to accept no such thing as a permanent plant food ratio and per acre rate of usage. This was right because soils undergo constant change—sometimes for the better, too often for the worse from heavy cropping, leaching, and erosion.

4 Varied build: Vary your sentence structure to show difference in importance of ideas—simple sentences, compound sentences, complex sentences. Each change in your sentence build can shift emphasis from one idea to another, sometimes slightly, sometimes drastically.
Example: Will high N increase K needs? The answer started showing first in corn yield tests. Then on grass—surprisingly, at first—where high nitrogen treatments had increased yield (you might say the grass's appetite) so much that most available potash was being drained from the pasture soil. Grass is a greedy feeder on potash, anyway. But the point was clear: that most factors boosting yields automatically increase potash needs. Nitrogen was no exception.

Rhythm is your insurance against monotony. Don't make every sentence short and simple ended by a period. Vary your sentences—both length and pattern. Throw in some personal sentences. Then a question. Use a sentence fragment. Then some quotes or direct requests. Variety holds your reader.

TUNE TO READER EXPERIENCE

Have you ever stopped to think where professional agriculture would be today without *the demonstration*, traditional in American agriculture?

The best research results are useless if people don't buy them. The same is true with your writing. You are demonstrating on paper what you have found through experiments.

How can you make your writing demonstrate? Tune it to your reader's

experience: through narrated illustrations, safe analogies, even an anecdote or two. Use words to create pictures.

This takes skill: using everyday examples to bring a technical point down to earth, where your reader is. Your example (or analogy) must be accurate, not a distorted comparison.

Interesting analogies spark up your style. For your layman, they help make your points clearer. For your colleague, they make you more interesting.

Take hidden hunger in crops, for example, a modern agronomic idea. The *hidden hunger* phrase captures people. But when you start to explain the principle, you can go into agronomic orbits: about visible deficiency symptoms, hidden deficiency, optimum levels of plant nutrients, approaching excess or hidden toxicity, excess or visible toxicity.

To help people understand how to meet hidden hunger, you can offer this advice—"professional," yet right out of the old feedlot:

EXAMPLE

> Chemist A. G. Norman recently said, "An ideal nutritional environment indeed may be one in which all nutrient elements are available to the point of slight luxury consumption at all times."
>
> Fertile soil is to your crop what a self-feeder is to cattle that select a balanced diet when it's readily available. Fertile soil is a chemical self-feeder where crops can get the plant foods they need when they need them. Plant food demands (or removals) increase during the growing season, according to plant sizes and numbers "eating" from your soil.

Another way to build identity is to tie your agronomic results to tangible benefits people can realize from such practices. For example, in one area farm income is held back by soil conditions, but farmers will not fertilize according to recommendations.

Then—an article appears comparing the price of a new refrigerator to the extra profits from specific yield increases *if* the soil is adequately fertilized. The wives may take it from there.

The point is to associate profitable soil practices with what those profits will bring: a college fund started for the son, a new milker for the dairy, a needed tractor, etc.

The profit pitch is not original. It goes back a half century in ag-writing records. But it never fails to interest readers because it is the end toward which all competitive farming works—*profit!*

Dr. George Scarseth was a master at analogy. Few agronomic writers will tune scientific principles into the average reader's mental antenna as he once did. I believe he could do it because he was unafraid to do it. His writings of a quarter century ago still instruct! All you have to do is update some figures and statistics.

Here is how Scarseth opened an article on the principles of "available potash" nearly 25 years ago.

EXAMPLE

> "If you stood leaning against the wall of the First National Bank that had a million dollars in its vaults, and you had only one dime in your pocket, there would be a total of one million dollars and ten cents within the circle of the bank and you.
>
> "But for you, only one dime of this great total would be available for your immediate use. A soil may have a total of 40,000 pounds of potash stored within an area of 1 acre to a depth of 6 inches, but have only 100 to 600 pounds or less potash held in such a way that plants can get it.
>
> "The potash that is unavailable to plants is firmly locked inside the rock and clay particles of the soil and is dependent upon years of weathering to be made available. The relatively small amount that is available is loosely held and is called exchangeable. It is this exchangeable potash that needs to be replenished in crop growing processes, or soils will be exhausted for available potash, even though the total insoluble quantity is great."

When you tune into reader experience, remember the key: *reader interpretation.* Don't give him something that means one thing to you but quite another thing to him. A newspaper reporter once gave this classic:

> One man comes home and says to his wife: "My dear, when I look into your face, time stands still."
> Another man comes home and says: "My dear, your face would stop a clock."

Words. They did it. And you can safely bet they'll do it *for* you or *to* you.

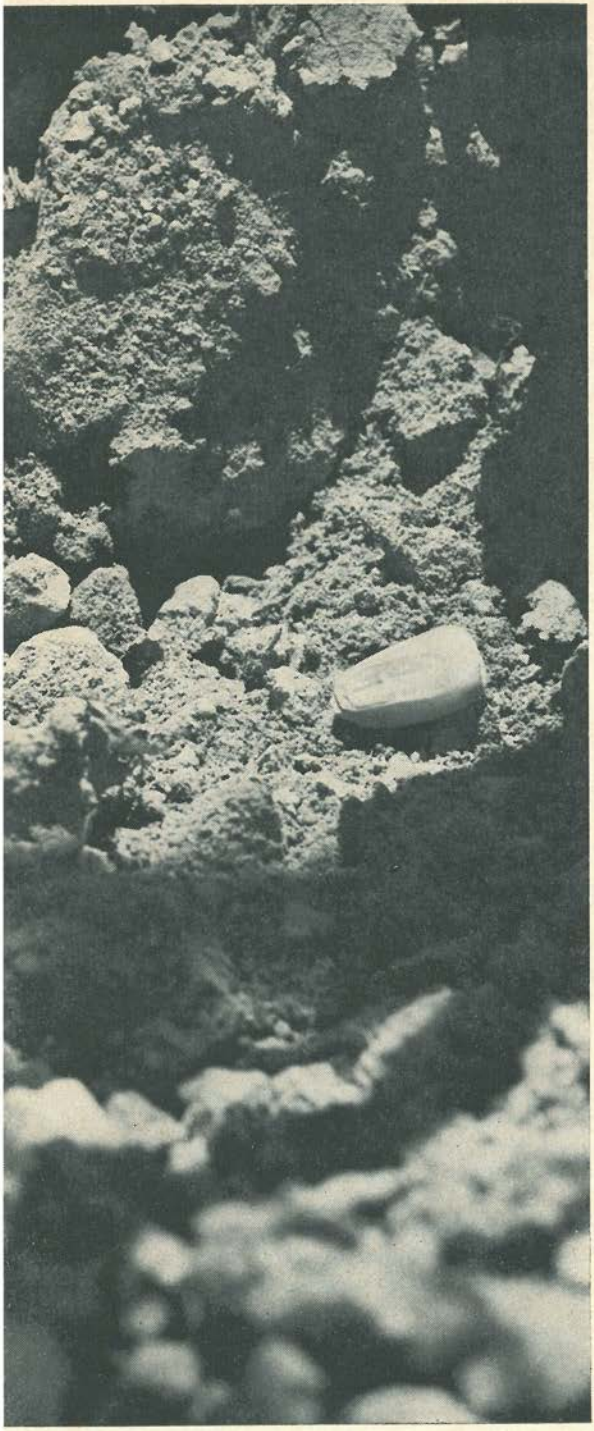
Polishing Your Article

This step can make your article professional. It takes mental elbow grease—tough discipline. But you should put your article through this four-reading wringer:

Read . . .

> **For content:** Don't heed how you said an idea, but *what* you said. Test each point: Is it really important, does it really apply, is it relevant?
> **For organization:** In arranging your parts, did you put the major ideas first, the minor ideas second? Check the basic logic of your thinking sequence.
> **For development:** Watch for underdeveloped points. Have you developed each point according to its true value? You haven't written more than necessary? You haven't given more space to a minor point than to a major point?
> **For style:** This is how you say it. Look for four things: (1) words that don't belong there, (2) awkward round-about phrases, (3) cumbersome sentences, (4) overloaded paragraphs.

THE END



For More Profits With Little or No Increase In Production Costs . . .

Plant Corn EARLY

By E. C. Rossman
Michigan State University

If you want higher corn yields and better quality, plant your corn in early May in Michigan—as soon as you can prepare a satisfactory seed bed after May 1.

If the weather is warm and the soil ready the last week of April, plant your corn then. But all farmers should be ready with seed, fertilizer, herbicide, and equipment by May 1, at least.

RESEARCH PROVES POINT

Planting-date research during the past 13 years at the Michigan Agricultural Experiment Station has supported early May planting. For example:

Date of Planting	Yield	% Moisture at harvest*	% Lodging	% Stand
April 25	**94**	23	9	91
May 7	**87**	24	13	89
May 17	**58**	26	7	94
May 24	**51**	29	5	91
May 31	**41**	34	4	94
June 8	**48**	38	4	91

* All plots harvested October 13.

1. Yields from May 1-10 plantings have averaged 13% more than May 15-20 plantings and 30% more than May 25-30 plantings.

2. Moisture content at harvest has averaged 2% higher for each week of delayed planting.

3. There has been no consistent difference in amount of lodging from early versus late plantings. Some years have shown more lodging from early planting, other years more lodging from late planting.

MOISTURE SHOWS WHY

The basic reason for higher corn yields with early planting is the available moisture.

In Michigan, a dry period of some length generally occurs during late July and early August. The critical period of a corn plant's life is the 3-4 weeks during tasseling, silking, and early ear development. Any deficiency of moisture and plant nutrients during this period will greatly affect final yields.

Early planting gets the crop tasseled and silked with larger, deeper root system and the ears more developed before moisture becomes limiting.

Rainfall at East Lansing in 1962 was nine inches below normal from April to September. The differences in favor of early planting were very striking.

Early planting (April 25 and May 7) in 1962 averaged 33 bushels or 57% higher yields than May 17 planting; 40 bushels or 79% more than May 24 planting; and 51 bushels or 119% more than May 31 planting.

HIGH QUALITY SEED

Most hybrid seed corn quality today is much superior to that of 15 years ago. We can now get good stands with corn planted in early May or even late April. Good seed corn is carefully harvested, dried, processed, treated with a fungicide to control soil and seed borne organisms, and stored under optimum conditions.

If the weather is cold and wet after planting, high quality seed corn can withstand 2-3 weeks of adverse conditions and still give a good stand.

Seed corn does not germinate until the soil has warmed to 50° F. The soil will warm to 50°F and above soon enough after early planting to give good stands.

With early planting, your seed population should exceed the desired plant population 20 per cent to allow for germination faults, seed predators, cultivation losses, etc.

TEST YOUR SEED

Don't forget that the germination percentages reported on the seed tag are obtained in a seed laboratory under optimum conditions of temperature and moisture. Such conditions seldom exist in the field.

To learn the ability of your seed corn to stand early planting, you may want to conduct a simple cold germination test on it at home before planting. Do it like this:

Soak a doubled piece of newspaper, sprinkle a ½ inch layer of soil (preferably from a previous corn field) on the paper, space 100 seeds on it, roll and tie loosely, put in an open fruit jar, place in cold compartment of home refrigerator (usually 45-50°F) for 10 days, remove to 70°F room temperature for 5-7 days (keeping it moist), and count number of healthy seedlings.

Such cold test germination may show your seed's capacity for early planting better than the warm laboratory germination reported on the seed tag.

If cold test is below 80%, you may want to exchange the seed or delay the planting.

SPRING FROSTS

Spring frosts after seedling emergence may kill some or all of the above-ground leaves. During a spring frost, the soil temperature may be above the air temperature. Unless the soil temperature also drops to freezing or below, the plants *will not be killed.*

The growing point or "heart" of the corn plant is below the soil surface until plants are 12-15 inches tall. New leaves will start from the growing point within 3-4 days and the plants will usually recover and still be ahead of replanted corn.

Pull some plants: if the below-soil tissue looks alive, do not rip up the field, leave it alone for 3-4 days, and it will probably begin to show green leaves.

You should use a pre-emergence herbicide on early planted corn to control weeds. If sprayed pre-emergence, you should face no unusual weed control problems when comparing early versus late planting.

LESS HARVEST LOSS

Early planted corn can be harvested during more favorable early fall weather.

So, lower harvest losses, less lodging, and less picker problems can be added to early planting advantages. Also, your crop is more likely to mature before frost, helping increase yield. Some parts of Michigan had killing frost on September 7 in 1962.

In summary, the merits of early planted corn are: (1) *higher yields,* (2) *more mature corn,* (3) *lower moisture,* (4) *easier and cleaner harvest,* and (5) *better quality corn with no major problems from lodging or weed control.*

These all add to more corn profits with little or no increase in production costs.

THE END