put its money on another horse. Form in the presentation is rightly considered indicative of form in the world of the project itself. Responsible audiences rarely play long shots on the character of a project leader. Their lives are risky enough already. It is not enough to demonstrate talent. As Gracie Allen said: "Everybody's got talent; but can they wrap it up?" The presentor who shows that he can "wrap his talent up" for application to a proposed project is the one to bet on—and most people do.

II

Sources of Ideas

or

Hunting, Fishing, and Trapping in the Country of the Mind

Every human being has creative potential. He has had to handle a flood of sense impressions and ideas from the time he was born (or even before) just to survive and grow. Every one does this in ways unique to himself. Some retain the ability to seek and encounter new knowledge with the wonder and delight of a bright child until they die of old age; others find this ability handcuffed before adolescence. The first are the high-voltage idea generators; the others become time servers and cultural dropouts, careening from one physical stimulus to another merely to avoid boredom. Are these differences due solely to fate, unable to be influenced by the individual himself? If true, then all human effort to improve ourselves or understand our world is absurd. There are some who say they believe this, but they also continue to live. Their mere existence is the best refutation of their alleged belief.

If individuals can influence both development of their own abilities and alteration of their environment, then we leave the

dark jungles of alienation and enter the land of affirmation. Our search then narrows for *means* to transform latent capacity into ability. We will concern ourselves with development of one specific ability: the generation of ideas. Here in this last chapter are set out several approaches used by others in the hope that the reader will find some of them helpful. They are presented in full awareness that only the individual can teach himself. The most that teachers can do is make it a little easier to learn by showing how individual potential for idea generation has been tapped by others before him.

Serendipity entered our language as a description of this phenomenon: Significant discoveries are often made by searching for something else, entirely different. Horace Walpole coined the word from the title of an old fairy tale, *The Three Princes of Serendip*. As these royal folks travelled about, they seldom found what they were in quest of, but instead always fell into situations and accidents that proved better than their original goals. Their luck grew out of two qualities. First, they did set out on journeys and thus created an environment far richer in accidental possibilities than staying at home. Second, they were sagacious enough to see chances for improvement of their situation in the unexpected events. Successful "idea men" take almost exactly the same approach. In this they have kept alive the attributes found in children before we train away their original creative and uninhibited curiosity, and before we restrain their playfulness. Since they are not expected to know much, children are not afraid to ask: "How does it work?" "Why is he doing that?" or to show their ignorance. This makes them models of open-mindedness, always on the alert for wonder and delight at the unexpected. It takes years to suppress this, but when finally achieved, we produce an individual who is a model of conformity. His original gifts of wonder and sensitive observation have been reduced to a comatose condition. His work becomes a carbon copy of others, he has no opinions of his own, and he seems always at attention, awaiting the commands of others to be told what to do. Such individuals truly believe the slogan of George Orwell's 1984, "Freedom Is Slavery." But even such

diseased cases of total adjustment can be roused, for like Sleeping Beauty, their gifts are sedated, not dead. We just have to find the right stimulus to bring them to life.

An outstanding manager told me of the most intellectually stimulating incident in his life. It took place twenty years before, but was as fresh as yesterday to him. The executive was sent by his company as a Fellow in a graduate training program, for men of unusual promise, at the Massachusetts Institute of Technology. On the first day, all of the Fellows were addressed by Norbert Wiener, the founding father of Cybernetics. Wiener had been a child prodigy, philosopher, linguist, novelist, mathematician, and expert in several other scientific and artistic fields. His credentials as an idea generator were impeccable and awesome.

Wiener began with an ironic flick: "I have never before stood before such a splendid array of future captains of industry. I'm deeply impressed; but, tell me, do any of you ever do any *thinking*?"

The audience remained silent, reacting prudently to the tone of veiled hostility.

"Come now, don't be afraid to speak up. Tell me some of the great thoughts you've had recently."

Silence.

"None?, well let's see what you can do with these." He looked down at the list of names in front of him, stabbed his pencil into it to select his victim and called out the name of the manager who told the story: "Ferguson. Let's find out what you know about giraffes and whales. What do you think happens to a giraffe's blood pressure when he raises his head? Does it go up or down?"

My informant said he had no idea.

"Think, man! You're an engineer and must know something about hydraulics. Don't you have to pump harder to raise a liquid to a higher level? Isn't blood a liquid, and isn't the heart a pump?"

Yes, my acquaintance admitted, and now that Dr. Wiener had pointed out the analogy, he could see how the blood pressure would have to rise.

"Wrong!" shouted Wiener. "It stays the same, and *nobody knows how the giraffe does it!* Don't you find that interesting and worthy of thought? Now, let's turn to whales. Do you know what 'the bends' are?"

The manager brightened a bit and said that they were ailments seen in deep sea divers and tunnel construction workers who suffered pains due to nitrogen bubbles collecting around the joints when subjected to rapid changes in pressure. He went on to say that "the bends" were prevented by lowering and raising divers very slowly to allow the nitrogen to dissipate gradually.

"Very good, Ferguson. Now tell me how you would account for the fact that a whale can rapidly dive hundreds of feet and then return to the surface immediately without dying from the bends?"

Ferguson was speechless.

Again the shout, "*Nobody knows how!* The whale knows a trick we don't. Let's talk about ways to find out."

Whoever arranged that curriculum knew his business. As unlikely as Wiener was to play the role of the Prince in *Sleeping Beauty,* he taught this group of intelligent men to look at their world with new eyes, by taking them back to attitudes of childhood. The subsequent weeks of more traditional subjects benefited no end from this bizarre introduction to idea generation. I asked Ferguson if he knew why Wiener used these examples. "Yes. I found out later that at the time of our course he was working on ways to use automation for the administration of anesthesia. This led him to a concern with blood pressure, respiration, and various mixtures of atmospheric gases. When he hit us, he was up to his ears in the subject." This anecdote illustrates another powerful method of idea generation: the pursuit of a solution to another specific problem, just like the Princes of Serendip. We will discuss that aspect a little later, for what often appears to the outsider as pure luck results from ways to sensitize the mind for attention to events and knowledge that would otherwise be ignored as irrelevant.

We sometimes see the approaches of childhood—wonder and curiosity—when a man takes on a job new to him. Whether he is a graduate entering employment, or a new governor of a state,

his early days are often the golden period of his innovations. He asks as many questions as an eleven-year-old, listens attentively to everyone, finds zest in everything going on, is unafraid to show his ignorance, and has scores of suggestions for improvements. He finds people eager to help him, and they bring up many of their previously rejected ideas for another try. A spirit of optimism and excitement prevails. It is slowly eroded only by the weight of tradition, disappointing experiences, and caution, which grind down the spirit by excessive concern over procedural minutiae or capitulation to inertial forces. The ultimate degradation can be seen when the initial attitude of exhilarating exploration is completely replaced by one of passive defense of the status quo. Wise leaders always keep some of this childhood fun in their organizations (though they'd dislike the description), for it secures the probing and questioning examination of the present necessary to improve the future. They sometimes do this by transferring burned-out, jaded men to different jobs both to revive them in a new environment and to give their former subordinates a change of air. These leaders also use many devices to keep their people's interest high. One of the best is to make it safe and rewarding to express individual opinions on important issues.

You can observe the counterpart to this in elementary schooling. One teacher is interested only in having played back to her in tests the canned opinions of a great fictional work read by the class. Another shows that she is interested in each child's personal view of the book. The first kills idea production, the second fertilizes it.

Another tendency in childhood, disturbing to adults, is daydreaming or reverie. Yet the greatest creative minds have all admitted to indulging in it throughout their lives. Of course it can be carried to excess, but if it is completely obliterated, no ideas of importance can grow. Reverie or quiet reflection allows images in the mind to rearrange and group themselves in new combinations with a minimum of inhibitions. What we later call inspiration had its source in such moments.

Research on creative individuals shows that they go through several stages in producing a new idea. There are many different labels for these stages, but here is one list: 1. Problem discerned

vaguely; 2. Search for additional facts; 3. Sort out facts for gaps and sharpen problem statement; 4. Incubation—frustration, rearranging, and letting subconscious work on the problem. This occurs even when the problem is consciously put aside; 5. Illumination—insight arrives instantaneously due to "seeing" new combinations or new viewpoint; 6. Conscious exposition and test of the insight produced.

Reverie allows incubation to do its job. Almost every great thinker reports that illumination came on walks, at sports, while shaving, on awaking, while listening to music, or otherwise removed from the conscious application of his mind to the problem. Many people suppress the incubation stage because of a Puritanical guilt about "not being busy"—most likely because they don't want others to see them so. They have equated toil with work. Until one gets over this feeling, he will never give his potential for ideas a fair chance to break through the crust of mental confusion and fatigue.

This crust is formed by constant preoccupation with energetic demonstrations of active performance to others. The only ideas such people present are repainted versions of old solutions once used successfully by others, since these can be dredged up by muscle alone. These super-industrious people can be quite useful in the fact-gathering stage, but generally are a nuisance when a new insight or idea is needed. They have completely repressed their creative instincts, and their "innovations" all carry a smell of the antique shop. Whatever facade they erect can usually be penetrated by watching their attitude to a genuine new insight. They invariably dismiss it as "blue sky" on first hearing. When proven, they act as though they discovered it themselves. Sometimes it is not their fault, as in those sad cases where promising graduate students apprentice themselves to a great and eminent professor. Too many years of this and they become feeble imitations of their master, with all of his weaknesses and few of his strengths. They often spend the rest of their lives in redundant elaboration of the great man's ideas, content to bask in his reflected glory. Do not expect new ideas from these unfortunates, but be especially wary of them if your idea questions or contradicts the work of their master.

IDEAS TRIGGERED BY INVOLVEMENT WITH OTHERS

Solutions to many problems lying below the peaks of genius can come by hunting for them in bands. The dialogue between people of diverse backgrounds acts as a substitute for the incubation stage. Their different ways of looking at a problem result in the kind of illumination produced by one individual's imagination or subconscious rearrangements. In general, the more varied the backgrounds available, the greater the chance to "breakthrough" the inhibitions of the present. The history of Operations Research is nothing but the achievements of such groups, where widely diverse skills were concentrated on a common problem.

A classic example came from a frozen food company, which faced an "impossible" problem in coping with the social clashes between migratory farm workers and residents of the local towns. Every obvious solution of better housing, recreational facilities, programs for children, schools, and improved medical care was tried. They all helped a little, but behavior soon regressed. At one crisis meeting, everybody in the company who had the remotest interest was invited. As the gloomy chronicle unfolded, everyone assumed an air of desperation—except one man. He was a climatologist and pointed out that the problem arose because the influx of the workers could not be scheduled to match the maturation of the crops to be picked. That's why they often sat around waiting for the crops to grow, got restless, went into town out of boredom, and got into trouble. He said that the problem would disappear if they could get the crops to grow on schedule!

He was almost hooted down as crazy to suggest that, but the management was desperate enough to let him try. After several failures, he finally found the solution. He "invented" a biological clock by planting a special kind of pea in every plot of the various crops. The pea's growth was the standard to predict with great precision the maturity and peak harvesting of the crop itself. Every factor of rain, sun, soil, and fertilizer affecting the crop was reflected in the growth of the pea plant. By watching *it*,

and not the crop, the crop's maturity and the schedule of the workers could coincide.

It worked. The efficiency produced reduced the troublesome mixture of long waits and frantic rush, allowed a steadier pace of work, reduced those trips to town due to previous frustration, and the "impossible" social problem disappeared. There were many other beneficial effects and not one negative. The climatologist at the big meeting played the role in his company's collective consciousness of the uninhibited rearrangement that takes place in the subconscious of an individual. Comic cartoonists often show that one of their characters "gets an idea" by drawing a picture of a turned-on light bulb in the "balloon," which usually carries his statements. Such cartoonists are close to the truth, for the process occurs almost exactly that way.

Another inducement to the generation of ideas from groups comes by creating a permissive atmosphere for apparently wild, irrelevant, or playful suggestions. These suggestions are not usually practical in themselves, but they act as seeds for the others in the group to develop into something useful. The flood of ideas only comes forth if there is no fear of censure, but some people can't stand the apparent disorder and should not participate. They act as dampers on the others' suggestions and suppress the more imaginative. One technique to prevent dampening calls for use of a small bell within reach of everyone in the group. If anyone censures a suggestion rather than building on or constructively modifying it, anyone can ring the bell to stop him. As silly as this may seem, it actually works. I have had the bell rung on me more times than I like to remember.

A strange thing happens to the negative-minded man of adaptive intelligence in such groups for the first time. After having the bell rung on him a few times, he becomes sensitive and resolves not to get caught again. At first he retaliates by being extremely watchful for the negative remarks of others, so that *he* gets a chance to ring the bell. This requires attentive listening. After a while, since he has now listened carefully and has suspended his critical faculty, his constructive participation takes off. Some of the best "idea men" I know went through this pattern. Sessions like this should not last more than an hour for they are exhausting. After the session, the group reverts to "normal" status and summarizes, winnows, criticizes, rejects, and retains the unrefined raw material of the freewheeling session. For this stage, it is best to stay in the same room where blackboards or easels have kept track of the imaginative session's fallout.

I cannot forget one of these sessions. It became so enthusiastic when hot on the trail of a solution that one of the participants could not restrain himself to wait for another pad of paper to be placed on the empty easel. The one blackboard was full, and he was too wrought up to use small sheets, so he seized the chalk and began to draw diagrams *on the wall.* He really had something, and others added their contributions alongside. The whole thing looked like an Italian opera without music. By the time we had the answer, the wall was a mess, everyone felt a little sheepish, but we did have something of value far exceeding the cleaning bill, and we might have lost it. There was also an unexpected benefit. Three days later the building people, on their own initiative, placed new blackboards completely around the room. We had started their idea without meaning to, by giving them a new problem.

One other brake on idea generation is to let considerations of *how* something can be done get in the way of deciding *what* should be done. Unless the objective or problem itself is clear, all the numberless variations of *how* to do it get in the way, and the discussion slithers off into barren controversy over different means. Such controversies are often meaningless, since they can't be related back to an agreed-on *What do we need to do?* Experts are prone to this disability, for they are always long on implementation alternatives, but short on objectives. They are overeager to get things to the point where they can bring their expertise to bear. Objectives require judgment; implementation requires technique.

In this type of idea generation, the temperature often goes high. When new to this approach, the lack of decorum can be embarrassing. Shirtsleeves, smoke, pacing, exclamations, laughter, interruptions, and hijinks remind one of a shop rather than an office. Ordinary rules of social interaction do not apply, for these sessions are more akin to painting a fresco during the

Renaissance than to a meeting of a board of trustees. In my experience it is a mistake to lower the heat in the interest of etiquette. The very heat of discussion, like a piece of red-hot iron, makes it easier to work the raw material and lets everybody land the hardest blow he's capable of. It is not wise to have wide discrepancies in rank of the participants *unless* those of higher rank can forget their advantage and operate on a man-to-man basis. When you do get such secure people they make great contributions. If you blunder and get someone of high rank who insists on using his privilege, it is not safe for the other members to throw themselves into the imaginative, productive mode. The session takes on the daintiness of a quilting bee. When this happens, the leader of the session should adjourn it at the first opportunity and reconvene with one less member.

All of us have acquaintances who are politely known as "men of independent judgment" but who are called "mavericks" by those who don't like them. They are rough-edged folk, dissatisfied with the existing order, but often unable to persuade others because of the antipathy their personalities generate. Sometimes they assume a cynical pose to hide a deeply felt but unpopular belief, yet deep-down are intensely loyal. Others are given to harmless eccentricities in clothing or behavior, which make them unwelcome in certain circles. Many of these good people are prolific generators of raw material for ideas, but lack the patience, skill, or interest required to work it up into usable form. They are always grateful for a listener and are glad to have others use their insights, for their greatest satisfaction is to see the unwanted children of their mind make good. Everyone truly interested in the production of good ideas should value the acquaintance of mavericks. The finest hour of a good presentor comes when he is able to secure recognition for one of these unsung thinkers.

Good ideas come from everywhere. They don't seem to care about their origin, only their viability. Everyone has his own story, each different from the other. Just as Will Rogers said that he never met a man he didn't like, you can never meet someone who can't teach you something. I was once responsible for the

design of instructions used by stockholders in filling out documents. My barber was a stockholder in my company before I was born and, when he heard where I worked, made many fine suggestions for improving the instructions. These were almost always used, and he took justifiable pride in his contribution.

A good attitude to assume for idea fertilization is this: What one man can build, another can improve. This is especially hard on those whose lives and energy have been spent in the building, but using it as a starting point separates the innovators from the caretakers. The builder's great accomplishment had to contend with all kinds of pressures, opinions, assumptions, and restraints at the time he did his work, and he was undoubtedly influenced by them. As time goes on, many of these change, and the builder himself, were he around to do it, would be the first to point out an opportunity for improvement. False loyalty to his work may deter diffident successors from making suggestions, but this is misguided. Many great ideas for improvement can come from reexamination of the inarticulate or forgotten premises of an existing philosophy, theory, institution, procedures, or relationships.

Thorstein Veblen observed that immutable conduct and progressively changing conditions result in a logical muddle. Keeping alert for logical muddles is a fine way to trigger inquiries that lead to new ideas. When you hear people recite a list of gripes, or complain that something "doesn't make sense," prick up your ears. This may be the tip-off that leads to an idea for authentic improvement. We live in such a complex world that many succumb to a view that stifles their talent for innovation. It happens like this. As their day begins, they see all the things they must do, and become worried that they will not get them done. They see their job as one of constantly trying to restore things to equilibrium. As events occur and are labeled "problems," action must be taken to restore the status quo. For many, this degenerates to transferring items from the "In" tray to the "Out" tray with maximum speed and minimum disturbance. When they encounter an authentic problem they do not see it as Henry Kaiser did, for he called problems "opportunities in work clothes." Instead they meet it as a disturbance to an already

uneasy orderliness, try to solve it with standard solutions, and if these fail, send it to someone else.

The easiest way to get a reputation as an idea generator is to let it be known that you are interested in those things nobody else wants. By tackling them your acquaintances will multiply, you will learn a great deal about the entire organization you work in, and you create a whole corps of scouts who send you the raw material for improvement ideas. Your associates will think you a little crazy at first, but the zest of the unusual and your expansion of knowledge will make up for it. The best illustration I know of the "Status quo" attitude appeared in a letter of explanation for a break-down in handling. After a long discourse on the procedures involved, the letter ended "Of course you must remember that these unusual occurrences occur very infrequently. One could easily get the wrong misconception that the procedures are inadequate." One likely misconception—right or wrong—is to expect the author of such a letter to look on any problem as an invitation to high adventure. Yet most good "idea men" do just that.

Another source of ideas is ponderously called "vulnerability analysis." Where the existence of actual problems sounds the call for a new idea to cope with the disorder of which it is the symptom, vulnerability analysis tries to *anticipate* the problems before they occur. Its approach to life is the opposite of Polyanna's or Dr. Pangloss's. When things are going smoothly, it tries to find the potential weak spots in industries, schools, banks, churches, defenses, processes, cities, or stores—anything that works as a connected system. Some examples might be:

Steelmaking: Enormous amounts of heat are required to melt and reheat the basic product many times from iron ore to finished goods. Any idea that can eliminate repetitive heating and cooling promises great benefits.

Chemicals: Requirements for fresh water are huge, and pollution from waste an increasing problem.

Universities: Constant review of age distribution, competence, coverage, and emphasis on various departments is required to plan for a balance of continuity of excellence and needed improvement.

Extractive Industries: Inventories of reserves, cost comparison of different methods, and exploration of new sources are necessary for survival.

Retailing: Population shifts, patterns for supply and distribution, and changes in taste make this field extremely complex. Ideas are needed in every phase.

It is an interesting exercise to do this for your own area of work in general and your own enterprise or institution in particular. Those with a gift for it will usually find great interest in their ideas, for vulnerability analysis goes to the heart of an operation in an over-all way. It addresses itself to problems that are the concern of everyone in the field, but are often neglected by narrow, specialist functions. There is an old organizational maxim: "Something that is everyone's responsibility becomes no one's responsibility." Vulnerability analysis tries to fill the gap. In its simplest form it asks this question: "Where can we expect the next problem to come from, and where will it hit us?" One of the worst pieces of vulnerability analysis was found in the Maginot Line. Since it was assumed impregnable, none of its guns could fire to the rear of the line. Positions were taken from the rear by encirclement.

Those with a speculative cast of mind often bait their hooks for ideas with questions beginning: "What if . . ." Professional politicians and other leaders seldom answer such questions in public. But they are in an awfully bad way if they don't have men on their staffs who ask all kinds of such questions privately —and then produce good ideas for coping with them. A variation of the "What if" method of provoking ideas comes from asking this question: "What would we do differently if we were putting this whole thing together for the first time?" This is a device to break through the layers of tradition, precedent, and experience. Once exposed, they can be tested for relevance and desirability in the present circumstances. In first-class organizations they usually hold up extremely well, but until reexamined, one can't be sure. The very act of reexamination is itself an idea generator, for it sends signals to all involved that their ideas and suggestions are welcome.

One can safely use this method only with those of constructive temperament. Unfortunately, there are some people burdened

with a nihilistic or bitter streak who can ruin an idea session built around this question by exploiting it as a therapeutic outlet for their frustrations. When this starts; stop! Reconvene later without them.

A powerful technique to focus concentration of attention for idea generation comes from "setting up" tasks for yourself or your associates.

Here are a few. Their main purpose is to trigger interest in what otherwise may be a dormant, indifferent, or self-satisfied mood.

Think ahead to the answer you would give to the highest ranking person in your line of work if he asked you this question: "Based on conditions as you know them here, what would *you* do to improve things, were you in my position as leader?" This question forces you—or the people in an idea session—to concentrate on *positive* action rather than compiling a long roll of vague complaints. Everyone has some capacity for this kind of role-playing, and you will often be surprised at those from whom the best ideas come. When the parish priest is invited to think like the Pope, or an assistant professor plays the part of the dean, or the foreman widens his view to that of the chairman of the board, or the head of a bureau takes account of the limited options of a governor, two salutary results occur. The participants *must* extend their vision beyond their own area of concern. This forces them to look at their work from a completely new angle. Such play-acting can produce ideas of immediate value to them after they shed the temporary glory and burdens of the powerful.

The second benefit comes from their surge of appreciation and understanding of the whole effort and their particular contribution to its success or failure. A leader of any kind of organized effort is wise to encourage such sessions. When the people involved in these roles *figure out for themselves* the over-all problems he faces, the leader can diminish his own chore of sermonizing or exhortation. This happens even if they are wrong in certain details because they lack specific pieces of information. If he is ingenious enough, the leader can set up channels to receive

the output of the sessions. One quick way is actually to ask the question as he visits the various groups. The jungle telegraph will broadcast his attitude faster than anything he can devise.

Another method of trapping for that increased personal awareness that triggers serendipity is to set down for yourself the seven greatest unsolved problems facing your organization, industry, or institution. Keep them near you and refer to them from time to time. They are the bait to which all kinds of events, advances, and disappointments can be attracted and tested for relevance. Ambassadors succeeding to a new post used to be presented a card by their predecessors as the change took place. On the card were listed the outstanding, current diplomatic problems between the ambassador's own country and the one to which he was assigned. Many carried this on their persons at all times, for it kept them alert for possible solutions whether they were at social functions, private audiences, or international conferences. The goal of every ambassador was to achieve what was called a "clean card." Few, of course, ever did. Their method is exactly the same as your own list, and even if it never becomes "clean," it at least amplifies the chances for success. In dynamic operations, as one item comes off, it is quickly replaced. You can expand your "trap line" by giving your list to other men you know who have a reputation for intelligence and imagination. Ask them to let you know of ideas and developments in their fields that might help solve those problems on your list. They will be pleased at your recognition of their talents, and will usually respond with enthusiasm.

Another way to "set up" a problem for yourself is to undertake to write an article on a subject of interest in your field. Keep two articles in mind, one for fellow practitioners, and one for a "popular" audience. It makes no difference for idea generation whether you ever publish them, but if you *are* serious, it increases your sensitivity. Secure two envelopes or folders in which you place clippings, ideas, or anecdotes which may be of use when you write the article. You will be amazed how the attention you give to everything you see or hear will be heightened. You are alerted to catch any specific information relevant to your articles, and will find yourself reading newspapers or magazines,

listening to presentations, looking at television, or perusing reports and books with a new sensitivity.

Similar effects are felt when you agree to deliver a speech or make a presentation. As soon as you have agreed, start labeling another folder, and let your acquaintances know that you are interested in any raw material that may help. This sort of thing breeds rapidly, and you will find yourself a new focal point for all kinds of ideas not even related to your request.

In Chapter 9 I discussed how "marginal men," those persons competent in one field who develop an interest in another, often make great contributions. Try to cultivate this attitude yourself, especially if you are professionally expert. Make excursions and welcome opportunities to participate in the activities of a field in which you have a latent, but unprofessional, interest. You will always get more than you give, for the view of your own field from a vantage point outside it will suggest ideas and applications that could not be seen from the inside. Analogy is a great creative tool and every field is rich in lessons and similarities for another. Jules Michelet, the French historian (1798–1874), summed it up this way as he presented prizes at a graduation exercise:

"Woe be to him who tries to isolate one department of knowledge from the rest. . . All science is one: language, literature and history, physics, mathematics and philosophy; subjects which seem the most remote from one another are in reality connected, or rather they all form a single system." Every time a "marginal man" makes a discovery overlooked by the indigenous specialists of a field, old Michelet's vision gets further support. Become a "marginal man" yourself, and welcome anyone who wishes to become one in your own area. Your idea production will soar if you do. It is the best antidote I know for the poison of narrow, jurisdictional concern, which kills ideas if they are born in the "wrong" place.

A radical approach to idea generation, which requires great nerve, injects the tremendous stimulus of a threat to survival into an operation. This is not for everybody, but when successful, the participants are astounded at their accomplishments. Here is one example of how it was used. A system of record-keeping, which

had used nine hundred tons of addressograph plates and manual records for forty years, was to be changed to an electronic computer system. There was grumbling and opposition from some older veterans who were skeptical of its success, and they avoided getting involved. But one day the moment of truth arrived. As the transition operation began, one of the veterans came to the leader of the new system and asked: "What should we do with the addressograph plates as their accounts are converted to the computer?" The leader knew that his questioner had opposed his idea, but that he was an excellent man who could contribute many ideas to help if he would only enlist. Previous attempts to get his support had failed.

The leader leveled his eyes, took a deep breath, and said, "Melt them down. If someone wants to cast some souvenirs from the molten metal, it's all right with me."

The veteran was aghast. He stammered: "But what if this system of yours doesn't work?"

The leader sighed, "If this system of *ours* doesn't work, *you and I* are not going to be the ones who put this whole thing back on the old system."

The veteran left quickly, and was overheard talking excitedly to his cronies, "My God! He's really serious about this thing!"

One week later the veteran had developed a brilliant idea for balancing accounts on the new system that had eluded the computer experts. At the completion of the transition he was promoted, placed in charge of the computer operations, and was a tower of strength until his retirement.

The leader told me that he got the idea for enlisting the veteran's help from the experience of Cortez in Mexico. After landing on the wild coast, some of the men lost courage and wanted to turn back. Cortez made the decision that stopped vacillation and made them concentrate on the real problem: He burned the boats. Risk and threat to survival mobilize intelligence dramatically, but they require a cool hand in charge. This method of provoking ideas should never be used by leaders who are nervous, timid, or uncommitted to the over-all idea itself. Such men encourage flight instead of ingenuity in those they presume to lead. Ship captains who pace the deck moaning "We're all going to drown!" are not good for anybody's morale.

READING AND IDEAS

One of the evils of what has come to be tiresomely known as the information explosion is its relentless tendency to narrow our reading. The pressures to confine ourselves more and more to reading in our primary field of interest must be resisted, if we are serious about generating new ideas. Those supple minds that make the great contributions have always been exercised by many interests. The narrowing specialist who tries to hone his skill by greater and greater concentration deteriorates in effectiveness. Shaw aptly described his terminal condition: He knows more and more about less and less until he knows everything about nothing. Such men are useful only as auxiliaries for better and broader minds, to be called on as one would grab an ice pick for a specific and well-defined task.

The best antidote for this is a wide range of reading. If an expert is really sharp, "outside reading" produces a flood of associations which drench his mind and allow promising and original approaches to sprout in his own field. One of the best comptrollers I know is good enough at geology to teach it in college. He has far more books on geology than on accounting in his home. The best experimental physicist I ever met was a recognized authority on beetles. The most humane and cultured financial officer I know is a national skeet champion and an ardent conservationist. Other acquaintances have similar "paired skills": An expert on financial operations has a profound grasp of Slavic history; an outstanding personnel specialist is learned in Post-Impressionist art; a first-class public relations practitioner is an authority on Mayan archeology; a management consultant's knowledge of geography would put world travelers to shame; a noted economist is a fine wood sculptor; and so on and on. I have little doubt that they are better in their chosen occupations *because of*, not in spite of, their interests and competence in other fields. In fact, it is difficult to find someone in the top drawer of contributors to his profession who does not do wide and lively reading outside it.

A senior editor once told me of the ways he used to keep oriented in our complex world. I have since used them myself

and found them so productive of ideas and insights that I set them down here. They are based on one method used by surveyors to establish their positions. This method is called *triangulation*, i.e., three angles. Surveyors take sights to three known objects at some distance from their position, preferably in widely different directions. The place where the three lines of sight intersect determines the position sought. (This is also the basis of celestial navigation; the "known objects" sighted are stars, planets, sun, and moon.)

How does one "take sights" through his reading? Here are the editor's suggestions: 1. Skim an entire daily newspaper. 2. Read a weekly news magazine or review; select different ones from time-to-time. 3. Pick up a trade paper remote from your own field every now and then. 4. Buy different monthly "opinion" periodicals, even if their editorial policy is repugnant to you. 5. Dip into so-called learned journals in other fields. If you grasp only the titles, you're ahead. 6. Scan a book review magazine of some kind. You may stimulate a latent interest. *Buy* some books; don't rely on friends. Use library copies if you can't afford them. 7. Read a foreign periodical frequently. If you know only English, use English, Scottish, Canadian, or Australian magazines. Some others are translated. 8. Reread a fine novel or classic untouched since your youth. You will be surprised at how different it is today. 9. Select a subject or a period in history for a few weeks of concentrated interest. Make it fun, not a chore. Stop when it becomes a bore or overtaxes your powers. Historical patterns help illumine today's events. 10. Do not be afraid of being called a dilettante. You are after stimuli, not professional standing.

After a while, these become almost habitual. Every excursion is like a sightseeing tour taken at your own pace. You will be a rare person indeed if you do not discover unexpected delights or get a new perspective on your own work.

Access to a good general encyclopedia is almost indispensable for quick reference. If you are fortunate enough to have one close by, dip into it as though sampling a plate of hors d'oeuvres. You may trigger an appetite for a heartier meal. Believers in serendipity are always justified by this exercise. If you have a problem on your mind in the incubation stage, you will often

discover a connection with pages opened at random. Specialist encyclopedias save an enormous number of false starts and redundant work. Besides, they are fun to leaf through.

MECHANICAL IDEA TRAPS

Ideas flit by at high speed and must be winged to bring them down to earth.

Keep some kind of notepaper within arm's reach at all times. Use napkins or other tissues in emergencies. I once saw an acquaintance write a note to himself on a five-dollar bill in the middle of a symphony concert. He told me later that the idea was one of the best he ever had, for it solved a personnel problem which had been plaguing him for months. For group approaches to idea generation make sure that large paper easels or blackboards are available. Limiting everyone to small-scale pads constricts their thoughts in some strange way. Many don't believe this until they try the expanded approach. Then you can't take it away.

Some people keep "idea files" in which they collect all kinds of materials. They flip through them periodically or when a new problem arises. We all know some of those forlorn people who tell us: "I'm glad that somebody's finally getting smart. I hear that we're going to do what I suggested ten years ago."

Such people really do not deserve much sympathy, even when what they say is true. The person who kept running through his store of untimely ideas, alert and patient for the conditions that would make one of them feasible, deserves our plaudits, not he who shot an idea off like a skyrocket and then forgot it. Ideas are far more abundant than those who know how to care for them in infancy. "Idea files" are the nurseries of improvements.

RECREATION

One cannot engage in the idea business for long before he sees that frontal assaults do not always succeed. Our brains and minds work "in mysterious ways their wonders to perform." Experienced and successful generators of ideas know that they must often fall back and regroup for another try. This is the insight embodied in the sound advice to someone who has to make a serious decision: "Sleep on it. You'll see it much more clearly in the morning."

Recreation is another form of such strategic withdrawal and, when well-chosen, can magnify anyone's potential for idea production. In his most charming essay, Sir Winston Churchill examines the various avenues to recreation, with canny observation on their strengths and weaknesses. Here is a passage from his *Painting as a Pastime*, where he discusses the recreation appropriate for men who deal with things of the mind:

> But reading and booklore in all their forms suffer from one serious defect: they are too nearly akin to the ordinary daily round of the brain-worker to give that element of change and contrast essential to real relief. To restore psychic equilibrium we should call into use those parts of the mind which direct both eye and hand. Many men have found great advantage in practicing a handicraft for pleasure. Joinery, chemistry, book-binding, even brick-laying—if one were interested in them and skillful at them—would give real relief to the over-tired brain.

Sir Winston then goes on to push his own choice of painting. But don't let the title fool you. The first nineteen pages are recommended to anyone who is not satisfied with his present choice of recreation. Churchill did not find his until he was forty, and no one can surpass him as a guide and adviser to all of the possibilities. Recreation requires custom tailoring.

Those who deal in ideas should take care that they get a fit suitable for a long time and are not satisfied merely with the currently fashionable.

I come now to the conclusion of this long and one-sided conversation. If this book has any justification at all, it must be found in the fact that never before have men all over this planet been in greater need for insights, ideas, and practical solutions. These are badly needed, not only to cope with our complex

environment, but more importantly to find ways that advance the well-being of the entire human race. I am sure that many such improvement possibilities are scattered, but dormant, throughout our population. Unless these precious ideas can be expressed to others, hammered into useful programs by discussion, and embraced by those affected, we will fall short of what we want and need.

The reader who has stayed this far has proved the possession of one essential quality of a good presentor: persistence in the face of obstacles. I thank you for it, and wish you well, for *your* success is *our* success.

APPENDIX

Checklists

or

Every Man His Own Critic

This appendix splits into two parts. The first is designed like the checklist used by aircraft pilots *before* takeoff. It may be useful in inspection of a proposed presentation to insure that nothing important has been overlooked or taken for granted. The second is intended as an evaluator of the presentations of others. Critical examination of presentations as a member of the audience can furnish valuable lessons for your personal improvement. Those superior raise standards and suggest new approaches; those inferior furnish object lessons on what to avoid.

A. *Preflight Check for a Presentation*

1. Problem-Statement
   What are the two clashing images?
   What exists? What do you want to exist?
   Which of the various forms of statement is best: