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RESEARCH MAN VS. ADMINISTRATOR—THE RESEARCH MAN'S VIEWPOINT¹

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Before launching myself into the expected tirade of vituperative criticism of administrators in conservation, let me call on the World to witness my unhappy plight. The administrator who preceded me on this discussion panel is not just "an" administrator—he's my boss. The brass collar of servitude around my neck has his name engraved on it. The predicament calls to mind Eugene Field's review of a performance of the play *King Lear*, in which he wrote, "So-and-so played the King as though under constant apprehension that someone else was about to play the Ace." Nevertheless, this occasion provides a priceless opportunity to utter the suggestion that just possibly not all the failures in fish and game manage-

ment are chargeable to incompetent biologists, and that advances may not have stemmed solely from the sapience of administrators.

In Michigan, of course, any conflict of thought or deed between administrators and researchers is unthinkable. My remarks will be confined to a purely academic analysis of conditions which, I have been told, exist now and then in less enlightened organizations.

In all seriousness, I honestly believe there is far less lack of harmony and understanding between the field-and-laboratory chap and the front-office magnate than there was ten or even five years ago. Partly, perhaps, because many of today's administrators were yesterday's researchers, but also because both classes of workers have had time to get accustomed to the fact that neither one can get very far without the other. In an ideally functioning conservation organization, the administrator's decisions are constantly being made wisely, soundly, and safely on the basis of a continuing flow of new and better dope from the research staff. The research man, on his part, is able to devote his full time to the pursuit of the facts so dear to him, without worrying his pretty little head over such crass details as budgets, popular support, or

¹ Contribution from the Michigan Institute for Fisheries Research.

This paper presents the approximate text of a talk delivered at a symposium which opened the Tenth Midwest Wildlife Conference, held at Ann Arbor, Michigan, December, 9-11, 1948. It was preceded by an address of welcome by President A. G. Ruthven, University of Michigan, and a talk, "The Commissioner Looks at Researchers," by the Hon. Harold Titus, Michigan Conservation Commission; and was followed by a paper, "Further Needs in Wildlife Research," by Dr. Clarence Cotnam, Assistant Director, U. S. Fish and Wildlife Service.

political interference. It is only when one or the other, or both, deviate from this idyllic definition of function that frictions, frustrations, and recriminations arise.

In the research man's eyes, the greatest and least forgivable sin an administrator can commit is to announce some new policy, or even a supposed explanation of a biological phenomenon, on the basis of personal hunch or expediency, and to then direct his investigators to go out and get facts which will support his stand. Another aspect of the same sin is displayed by the administrator who inclines to suppress any findings of his investigative staff which run counter to his established policy. For the research man is basically an idealist; in a very real sense he is a dedicated man. If he were not, he'd be out selling life insurance and making a decent living. To him, the fact is the paramount goal, the open mind is the only proper attitude, and a ready willingness to admit mistakes and to revise policies is a sign of progress, not an admission of faulty judgment. The research man recognizes, as the administrator too often does not, that final, all-explaining facts are seldom learned—that his duty is to hew the path ever nearer, but that he will never reach the Ultimate Truth until he has joined the Choir Invisible. Hence he is the constant adversary of the *status quo*, a thorn in the side of those administrators whose goal is the speedy development of a management policy which will remain henceforth immutable and permit them to devote their declining years to the lining of their comfortable rut with plush while they bask in the applause of the multitude.

The scientifically-trained conservation worker knows that policies must constantly change, in the light of new research findings and with changing conditions in nature, and he often wishes his administrative superiors were more adept in explaining the desirability of these changes to the unenlightened license-holders.

The conscientious administrator might be well advised to add up the figures, occasionally, and see for himself how much time his so-called research workers are actually spending on activities unimpeachably of a research character. As any given organization grows in size, red tape grows with it. Presently some super-clerk will have prepared a ponderous mimeographed manual of procedure which, with frequent additions and changes, becomes the bible of all personnel. Its paragraphs, sub-paragraphs, and serially numbered and dated changes cover every activity of every employee and prescribe suitable forms, to be filled out in quintuplicate, for every situation which may arise in the employee's normal routine. There exists in the minds of some research workers a low, nasty suspicion that the time is not far distant when the manual of procedure will also prescribe the sort of research they are to do, the manner and place in which they are to pursue it—and the conclusions they are to come up with, these latter to be in full and hearty accord with existing policy. Meanwhile, their days become increasingly filled with the ringing of typewriter bells and the rustle of manifold paper. Insensibly, they themselves become super-clerks—or sub-deputy administrators—and the research program languishes, buried

beneath the sterile paper-work of a full-blown bureaucracy. Admiral Halsey, in his recent memoirs, deplored the day when a typewriter was first permitted aboard a fighting ship. And conservation administrators might find it profitable to spend fifty cents for extra clerical help to save a dollar's worth of a research man's time, rather than *vice versa*.

One criticism which administrators habitually level at their investigators, and which causes the latter much anguish, is concerned with the research man's unwillingness to release conclusions until he has checked, re-checked, and re-rechecked his data. The administrator who honestly favors research is impatient to obtain sound facts on which to base his policies; the one who has formed or inherited an investigative staff grudgingly feels that by coercing a steady stream of reports, half-baked or otherwise, he is forcing his "theorists" to buckle down and be practical. Charles F. Kettering is credited with an anecdote, probably not wholly apocryphal, of the early days of the automobile, when two industrialists had climaxed a long and honorable career as wagon-makers by converting to the manufacture of horseless carriages, and, in keeping with such a progressive step, had splurged to the extent of adding a chemist to the payroll. About 10:00 a.m. of the chemist's first day on the job, one partner approached the other and remarked, "Let's go down and see what the new man's invented." The other replied, "Oh, he's new to the place, let's give him plenty of time. Let's wait till after lunch." The technical literature of conservation is cluttered with

papers that should never have been published, but which were blasted out of insecure workers by administrators intent on getting "production" out of their staffs. Certainly many scientifically-trained workers tend to be over-cautious, and require some pressure. The smart administrator is the one who senses when to turn on the heat and when to ease off.

Bosses, unfortunately, are in many respects just as human as the hired help, and prone to seek, under pressure, the quickest means of getting annoying or embarrassing problems off their necks. In conservation, this buckpassing most frequently takes the form of a damaging diversion of investigators from valuable research projects to trouble-shooting and hand-holding assignments. True, in the field of conservation, where support depends on backing from a notoriously fickle public, attention to gripes and hollers from the license-holders is imperative; a squeaking wheel that isn't promptly greased sometimes heats up and locks with appalling celerity, with disaster to passengers and pay-load alike. The research man is exasperated and frustrated almost beyond endurance, however, when the administrator who has been sending him hither and yon on such errands one morning calls him into the front office and with sober gravity asks for a report on the research project the wretched investigator hasn't been able to give two days' consecutive thought in the past six months. At the present time, almost every state and federal conservation organization has some sort of public relations branch. Many of these seem to function chiefly as propaganda-dispensing agencies. However, a hopeful note is seen in a few

places where people with enough technical training to understand the research projects under way are being added to the staffs of such information and education agencies, and it is to be hoped that further progress in this direction may result in much over-all improvement in public appreciation of the problems and practices of conservation, as well as in a desirable diversion of excessive public-relations work from research personnel. The possibilities of demonstration and extension-type approaches in selling conservation to the public are just beginning to be explored. There are available many technically-trained workers who, while lacking the flair for or interest in research, are admirably fitted to direct extension and demonstration activities

"Here," the Red Queen said to Alice, "you have to run as hard as you can just to stay in the same place." Most game and fish biologists know what she meant. In conservation research it is almost impossible to stand still: one can go forward—or slip backward with astonishing rapidity. If, in response to any of a variety of all-too-well-known pressures, a given agency is forced to suspend or retrench its fact-finding program, even for a year or two, any subsequent attempt to restore it to its rightful position will require the expenditure of disproportionate effort and funds. Administrators are often subjected to pressure from biologically-illiterate laymen to quit spending money on research for five or ten years and just apply what is already known. Or at least, to refrain from supporting any research which, in the layman's eye, isn't of immediate and obvious practical advantage. How often, in the

past, has the cart been at least three trace-lengths in front of the horse, in fish and game management projects! How many times has a public clamor for action—"Let's DO something"—induced administrators to channel the efforts of their staffs into superficial, hastily-conceived investigations which yield spotty, misleading information in the main, and only by the wildest and rarest stretches of inspiration and plain dumb luck pay off in findings of permanent, usable value. The damaging effects of such short-sighted practice not only place our endangered game and fish resources in continuing jeopardy, but increase distrust of research by the layman, who seldom discriminates between sound research and these expediency-dictated activities which are masqueraded unjustifiably under the name of research. Here is another source of profound irritation to the investigator—the growing tendency to divert significant proportions of research budgets to programs of essentially routine *management* character—without so informing the license-holders, thus permitting them to infer that they are contributing a much larger sum to research than is actually the case.

Administrators, be it acknowledged, are generally rather gifted men, and one of their greatest talents is that of leadership. They are men who speak with authority, and to whom people listen. I believe that many of them do not make sufficient use of their ability in keeping the public apprised of the fact that scientific conservation of fish and game is truly in its infancy; that, although its progress is remarkable in view of the minuscule amounts of time, men and money invested in it as com-

pared with medical, industrial, or agricultural research, it is just barely able to walk, and shouldn't be expected to fly for some time to come. They might point out to those skeptics who would suspend further research on fish and game and confine all efforts to applying the pitiful modicum of facts already pegged down, that similar practices in other fields would have us living in a considerably different world today; medical science would still be confined to "applying" the interesting discovery that the blood circulates through the body; automotive engineers would have called it a day once they'd invented the self-starter. In selling the public (and perhaps themselves) on the essential value of fundamental research as a basis for practical application, they might cite the example of the physicists, today's unquestioned aristocrats, who thirty years ago were considered the most impractical and unworldly of pure scientists.

And constantly they should harp on how little, actually, is known—how little, in fact, could possibly be known in view of the small amount of effort thus far invested and the peculiar nature of the problems. It is impossible to make frequent contacts with fishermen and hunters without being struck by the average layman's almost complete lack of comprehension of the inadequacy of our proven, factual information. Very often he has assumed that the answers are in the back of the book. He expresses keen astonishment when he is assured that the book hasn't even been written. With his proneness to confuse fact and folklore, he has most of the answers ready himself. He will inquire, with asperity, why his state

conservation department should be supporting a study of, let us say, the life history of the brown trout. "Hell," he will say, "any damn fool knows that already." And he won't realize how true his profane restriction has made his statement. He has almost certainly never stopped to think that almost any field investigation of a fish, bird, or mammal, if it is to be successful, must cover a span of years sufficient to encompass at least one generation of the critter in question; and that several generations must be studied if cyclic patterns are to be clearly discerned, or effects noted of normally or abnormally changing environments.

There is perhaps no other field of human endeavor in which the lay public so freely arrogates to itself the privilege of passing judgment on accomplishments as in the field of wildlife conservation. The hunter or fisherman who has pursued his sport for twenty or thirty years rarely feels any hesitancy about stepping in and contradicting the professional man. He brusquely brushes aside the implications of findings long and laboriously accumulated by teams of sound, highly trained scientists if they do not coincide with his own prejudices—and it's just about as bad if they do, for then he's critical that time and money were spent to prove something that he, in his infinite wisdom, had known all along by hunch, osmosis, and divine revelation. It seems strange that the customers should so readily assume, on the basis of a long period spent as consumers, that they also are pre-eminently competent to dictate methods of production. Following that line of reasoning would lead to the conclusion that the best

physician is not the trained and duly certificated practitioner of medicine but the man who has been a life-long invalid; that the best automobile production chief is not the experienced engineer but the travelling salesman who needs a new car every six months; and that the man to consult when your affairs are in a legal snarl is not the practicing attorney but the man who has been run in by the cops every few months for the past ten years. This is not to say that the sportsman may not make worthwhile observations. Very frequently he does. But it is unusual indeed if he possesses enough collateral technical information, or subjects his observations to enough critical, objective scrutiny, to come up with the right management and production plan. After all, the sportsman approaches the pursuit of fish and game in a search for recreation. How much confidence would we have in the findings of a scientist if he entered his laboratory in a holiday mood, with a bottle of Old Tanglefoot on his hip, and remarked now and then to casual passers-by, "I just love to mess around with test-tubes and stuff—it's so relaxing."

My reason for considering the layman's attitude at some length is the fact that frequently it happens that such men are awarded policy-forming positions in conservation agencies. As a rule they have been quite successful in the business world, and have made a lot of money backing their hunches. There is a great deal of good that can be done by administrators with these abilities. But in the main, they will be well advised not to substitute their hunches for a research program. Trout and bass and deer and partridge are

remarkably oblivious to applications of sound business psychology. On the other hand, men with outstanding executive ability can be of very great service to a conservation program if these abilities are directed at facilitating the work of the investigators and implementing it in the form of well-grounded management plans. And another point in favor of such men is their rather general possession of plenty of guts.

In this respect they contrast very favorably with a few conservation administrators—happily, fewer every year—who, when some of their staff are under fire from unenlightened pressure groups, hastily and spinelessly join with the critics in raising Cain with their subordinates in the hope of gaining cheap publicity and favor. In his notoriously underpaid status the research man is insecure enough without having to experience unreasoning sniping from both within and without the organization. It is natural that administrators should give heavy consideration to loyalty when rating their subordinates. But loyalty means little in an agency unless it works down, as well as up, the chain of command. It is an axiom in the military service that an officer who never lets his men down will, in his turn, never be let down by his men. Needless to say, the research man is human enough to respond favorably to flattering attention. He likes to think that the big boss knows something about what he's doing, and if the boss utters a word of praise or encouragement it's almost as heartening to him as the longed for dollar-per-year cost-of-living pay boost. It's a sorry sort of organization where the boss looks in on his subordinates only to bawl them out.

And another point of importance in considering the effect of administrator-investigator relations on organizational morale—when reports are published, it's awfully nice to know who really wrote them. Reports appearing simply under the name of the department or agency chief are annoying to the technical man. No doubt it greatly impresses the license-holder who may conclude, from the printed report, that Mr. J. Worthington Glutz, Chief of Fish and Game for the sovereign state of East Hypothetica, has found time during the busy biennium just past not only to say a few words at 1,057 sportsmen's club meetings and draw up blueprints for a new fish hatchery, but also to read 50,000 fish scales and analyze the contents of vast numbers of trout and partridge stomachs. It is important to research men to see their own names on reports they have written. It is important to them to have ready access to means for publishing their findings. They are sometimes criticized, and in some instances justly, for trying to build up big publication lists. But it should be understood that publications are the research man's only monument. He deals with intangibles, and his greatest pearls of wisdom are destined to be always anonymous in the eyes of the lay public. But he values the opinions of his colleagues, approbation and criticism alike. *It is only through publication that his research findings can be subjected to critical evaluation by the only men competent to judge them and to criticize them constructively.* And it is only through the constant operation of criticism and re-trial that progress can be maintained in investigational work. Administrators can win much favor

with their biologist subordinates by establishing for their use regular publication series. Such publications will never enjoy the popular sale of a bosomy historical novel, but almost every copy will be read and criticized by an able man, and the net result to the administrator will be a body of well-verified facts reaching his hands sooner than if his staff worked alone and unaided. Not so long ago, there were conservation supervisors who were imbued with the old Scotch gamekeeper philosophy of secretiveness—of keeping all facts close hidden lest the fellow across the line in the next state see them and profit by them. This philosophy has no place in American conservation and is probably dead; but the surest guard against its resurgence in any quarter is an abundance of publication media.

Administrators are generally strong men, men of high personal ambition. When two such characters collide head on, or even find they are expected to pull toward a common goal together, dangerous antagonisms may arise. In the fang-and-claw world of private enterprise, such antagonisms and their carnivorous sequelae may be taken for granted. But in a service dedicated to the public welfare, it is disheartening indeed to see desirable interagency cooperation and coordination of effort hamstrung because the top men don't like each others' neckties. It is costly to the public and damaging to research interests when a number of empire-building administrators set up competing investigative agencies to work on the same, or nearly the same, problems—but from different headquarters, with different equipment. Just as the inefficiencies made obvious by the war

forced an attempt at unification of the armed services, so the demands of conservation problems require the close cooperation of interested agencies at all levels. There is no justification for the failure of a program when this failure stems from the petty personal jealousies and antagonisms of its top administrators.

Until now I have refrained from commenting at significant length on the effect of finances on the relations between administrators and their research staffs. Admittedly, the times we are now living in are chaotic, from the economic standpoint, and there are few who can prophesy the future with conviction. The scientist is by definition an impractical sort of fellow, far more interested in being able to work in his favored field than in amassing material competence. However, the scientist's family likes to eat.

For the biologist who has spent eight or ten years in college and university gaining the sort of training requisite for grappling with fish and game problems, only a few fields of endeavor are open. All are in public service; openings in private business or industry for such candidates are negligible. He can choose between teaching and applied work, and in the applied field between the various conservation agencies of the several states and of the federal government. In the depression years of the early thirties, when the establishment of conservation research staffs first gained headway, many a teacher of biology left off molding the plastic adolescent mind, and turned, with happy hosannas, to the new field. The

change made sense to his practical-minded wife, too, for in those days conservation jobs paid better than teaching; recognition of the less secure nature of these jobs, of the shorter amount of vacation and leisure time, took the form of higher compensation. In recent years, however, research jobs in conservation have lagged far behind the procession of wage increases in other lines of endeavor. Today, a young man just completing his training is much more likely to turn to teaching than to a job with someone's conservation department, for now it will offer him more pay as well as greater security, professional prestige, and leisure for study or travel. Or, if he joins a conservation agency, economic necessity will drive him to seek, as rapidly as possible, appointment to an assignment of administrative character, that being the only other avenue for financial betterment open to him.

The net result of this situation so far as the administrator is concerned is that the bulk of the research on which he is to base his policies will be done by graduate students and immature, unseasoned investigators. I by no means minimize the value of the work done by such young men. Many of the fundamental facts of our profession were established by them. But much more rapid advances could be gained if competent research men could be held, and their growing abilities kept in the research field, not diverted into less productive but more gainful assignments. Can the administrators do something about it?

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by

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Administrators, be it acknowledged, are generally rather gifted men, and one of their greatest talents is that of leadership. They are men who speak with authority, and to whom people listen. I believe that many of them do not make sufficient use of their ability in keeping the public apprised of the fact that scientific conservation of fish and game is truly in its infancy; that, although its progress is remarkable in view of the minuscule amounts of time, men and money invested in it as compared with medical, industrial, or agricultural research, it is just barely able to walk, and shouldn't be expected to fly for some time to come. They might point out to those skeptics who would suspend further research on fish and game and confine all efforts to applying the pitiful modicum of facts already pegged down, that similar practices in other fields would have us living in a considerably different world today: medical science would still be confined to "applying" the interesting discovery that the blood circulates through the body; automotive engineers would have called it a day once they'd invented the self-starter. In selling the public (and perhaps themselves) on the essential value of fundamental research as a basis for practical application, they might cite the example of the

physicists, today's unquestioned aristocrats, who thirty years ago were considered the most impractical and unworldly of pure scientists.

And constantly they should harp on how little, actually, is known --how little, in fact, could possibly be known in view of the small amount of effort thus far invested and the peculiar nature of the problems. It is impossible to make frequent contacts with fishermen and hunters without being struck by the average layman's almost complete lack of comprehension of the inadequacy of our proven, factual information. Very often he has assumed that the answers are in the back of the book. He expresses keen astonishment when he is assured that the book hasn't even been written. With his proneness to confuse fact and folklore, he has most of the answers ready himself. He will inquire, with asperity, why his state department should be supporting a study of, let us say, the life history of the brown trout. "Hell," he will say, "any damn fool knows that already." And he won't realize how true his profane restriction has made his statement. He has almost certainly never stopped to think that almost any field investigation of a fish, bird, or mammal, if it is to be successful, must cover a span of years sufficient to encompass at least one generation of the critter in question; and that several generations must be studied if cyclic patterns are to be clearly discerned, or effects noted of normally or abnormally changing environments.

There is perhaps no other field of human endeavor in which the lay public so freely arrogates to itself the privilege of passing judgment on accomplishments as in the field of wildlife conservation. The hunter or fisherman who has pursued his sport for twenty or thirty years rarely feels any hesitancy about stepping in and contradicting the professional man. He brusquely brushes aside the implications of findings long and laboriously accumulated by teams of sound, highly trained scientists if

they do not coincide with his own prejudices--and it's just about as bad if they do, for then he's critical that time and money were spent to prove something that he, in his infinite wisdom, had known all along by hunch, osmosis, and divine inspiration. It seems strange that the customers should so readily assume, on the basis of a long period spent as consumers, that they also are pre-eminently competent to dictate methods of production. Following that line of reasoning would lead to the conclusion that the best physician is not the trained and duly certificated practitioner of medicine but the man who has been a life-long invalid; that the best automobile production chief is not the experienced engineer but the travelling salesman who needs a new car every six months; and that the man to consult when your affairs are in a legal snarl is not the practicing attorney but the man who has been run in by the cops every few months for the past ten years. This is not to say that the sportsman may not make worthwhile observations. Very frequently he does. But it is unusual indeed if he possesses enough collateral technical information, or subjects his observations to enough critical, objective scrutiny, to come up with the right management and production plan. After all, the sportsman approaches the pursuit of fish and game in a search for recreation. How much confidence would we have in the findings of a scientist if he entered his laboratory in a holiday mood, with a bottle of Old Tanglefoot on his hip, and remarked now and then to casual passers-by, "I just love to mess around with test-tubes and stuff--it's so relaxing."

My reason for considering the layman's attitude at some length is the fact that frequently it happens that such men are awarded policy-forming positions in conservation agencies. As a rule they have been quite successful in the business world, and have made a lot of money

backing their hunches. There is a great deal of good that can be done by administrators with these abilities. But in the main, they will be well advised not to substitute their hunches for a research program. Trout and bass and deer and partridge are remarkably oblivious to applications of sound business psychology. On the other hand, men with outstanding executive ability can be of very great service to a conservation program if these abilities are directed at facilitating the work of the investigators and implementing it in the form of well-grounded management plans. And another point in favor of such men is their rather general possession of plenty of guts.

In this respect they contrast very favorably with a few conservation administrators--happily, fewer every year--who, when some of their staff are under fire from unenlightened pressure groups, hastily and spinelessly join with the critics in raising Cain with their subordinates in the hope of gaining cheap publicity and favor. In his notoriously underpaid status the research man is insecure enough without having to experience unreasoning sniping from both within and without the organization. It is natural that administrators should give heavy consideration to loyalty when rating their subordinates. But loyalty means little in an agency unless it works down, as well as up, the chain of command. It is an axiom in the military service that an officer who never lets his men down will, in his turn, never be let down by his men. Needless to say, the research man is human enough to respond favorably to flattering attention. He likes to think that the big boss knows something about what he's doing, and if the boss utters a word of praise or encouragement it's almost as heartening to him as the longed for dollar-per-year cost-of-living pay boost. It's a sorry sort of organization where the boss looks in on his subordinates only to bawl them out.

And another point of importance in considering the effect of administrator-investigator relations on organizational morale,--when reports are published, it's awfully nice to know who really wrote them. Reports appearing simply under the name of the department or agency chief are annoying to the technical man. No doubt it greatly impresses the license-holder who may conclude, from the printed report, that Mr. J. Worthington Glutz, Chief of Fish and Game for the sovereign state of East Hypothetica, has found time during the busy biennium just past not only to say a few words at 1,057 sportsmen's club meetings and draw up blueprints for a new fish hatchery, but also to describe five new species of parasites from ducks, read 50,000 fish scales, and analyze the contents of vast numbers of trout and partridge stomachs. It is important to research men to see their own names on reports they have written. It is important to them to have ready access to means for publishing their findings. They are sometimes criticized, and in some instances justly, for trying to build up big publication lists. But it should be understood that publications are the research man's only monument. He deals with intangibles, and his greatest pearls of wisdom are destined to be always anonymous in the eyes of the lay public. But he values the opinions of his colleagues, approbation and criticism alike. It is only through publication that his research findings can be subjected to critical evaluation by the only men competent to judge them and to criticize them constructively. And it is only through the constant operation of criticism and re-trial that progress can be maintained in investigational work. Administrators can win much favor with their biologist subordinates by establishing for their use regular

publication series. Such publications will never enjoy the popular sale of a bosomy historical novel, but almost every copy will be read and criticized by an able man, and the net result to the administrator will be a body of well-verified facts reaching his hands sooner than if his staff worked alone and unaided. Not so long ago, there were conservation supervisors who were imbued with the old Scotch gamekeeper philosophy of secretiveness,--of keeping all facts close hidden lest the fellow across the line in the next state see them and profit by them. This philosophy has no place in American conservation and is probably dead; but the surest guard against its resurgence in any quarter is an abundance of publication media.

Administrators are generally strong men, men of high personal ambition. When two such characters collide head on, or even find they are expected to pull toward a common goal together, dangerous antagonisms may arise. In the fang-and-claw world of private enterprise, such antagonisms and their carnivorous sequelae may be taken for granted. But in a service dedicated to the public welfare, it is disheartening indeed to see desirable inter-agency cooperation and coordination of effort hamstrung because the top men don't like each others' neckties. It is costly to the public and damaging to research interests when a number of empire-building administrators set up competing investigative agencies to work on the same, or nearly the same, problems,--but from different headquarters, with different equipment. Just as the inefficiencies made obvious by the war forced an attempt at unification of the armed services, so the demands of conservation problems require the close cooperation of interested agencies at all levels. There is

no justification for the failure of a program when this failure stems from the petty personal jealousies and antagonisms of its top administrators.

Until now I have refrained from commenting at significant length on the effect of finances on the relations between administrators and their research staffs. Admittedly, the times we are now living in are chaotic, from the economic standpoint, and there are few who can prophesy the future with conviction. The scientist is by definition an impractical sort of feller, far more interested in being able to work in his favored field than in amassing material competence. However, the scientist's family likes to eat.

For the biologist who has spent eight or ten years in college and university gaining the sort of training requisite for grappling with fish and game problems, only a few fields of endeavor are open. All are in public service; openings in private business or industry for such candidates are negligible. He can choose between teaching and applied work, and in the applied field between the various conservation agencies of the several states and of the federal government. In the depression years of the early thirties, when the establishment of conservation research staffs first gained headway, many a teacher of biology left off molding the plastic adolescent mind, and turned, with happy hosannas, to the new field. The change made sense to his practical-minded wife, too, for in those days conservation jobs paid better than teaching; recognition of the less secure nature of these jobs, of the shorter amount of vacation and leisure time, took the form of higher compensation. In recent years, however, research jobs in conservation have lagged far behind the procession of wage increases in other lines of endeavor. Today, a young man just completing his training is much

more likely to turn to teaching than to a job with someone's conservation department, for now it will offer him more pay as well as greater security, professional prestige, and leisure for study or travel. Or, if he joins a conservation agency, economic necessity will drive him to seek, as rapidly as possible, appointment to an assignment of administrative character, that being the only other avenue for financial betterment open to him.

The net result of this situation so far as the administrator is concerned is that the bulk of the research on which he is to base his policies will be done by graduate students and immature, unseasoned investigators. I by no means deprecate the value of the work done by such young men. Many of the fundamental facts of our profession were established by them. But much more rapid advances could be gained if competent research men could be held, and their growing abilities kept in the research field, not diverted into less productive but more gainful assignments. Can the administrators do something about it?

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