The Leadership of Philosopher Kings

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LA--12198-MS

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OUTLINE

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ABSTRACT

A "rule of seven" implies a scientific organization in which each leader is expected to contribute technically, giving each member a responsibility for the creative work needed for effective leadership. It would decentralize leadership, pushing decisions down to the level where they should be made. Such a structure need not be imposed from above.

I. INTRODUCTION

It is said that Harold Brown, while at Livermore, discovered the "rule of seven," which he applied with success in his later positions. The rule is that if you have seven people reporting to you directly, it is a full time job just to let them report to you. It is not recorded whether he also discovered its two main corollaries:

1. If you have more than seven people reporting to you, you are just wasting everyone's time, and

2. If you have fewer than seven people reporting to you, you might actually get something done yourself.

The rule and its corollaries have apparently not been subjected to scientific test, although Brown's success speaks for

itself. This note doesn't test them either. It just takes them as useful observations from experience, treats them as if they were a valid model for organizing large scientific organizations, sketches out the basic scaling results, and discusses the relationships between members.

II. ORGANIZATION

It is assumed here that a scientific organization has as its goal the production of science. Thus, assuming the validity of the rule of seven, if leaders at all levels were saturated with the full seven subordinates, no scientific work would be done at all above the staff member level. Since those above that level are numerous and presumably talented, it seems wasteful to omit them from the process. Below, an alternative arrangement is studied in which it is assumed, somewhat arbitrarily, that each leader has only enough subordinates to take up about half his time. The rest is devoted to responding to his superior and to doing research. The former is assumed to be a small fraction.

If it is assumed that each leader has 3 subordinates and devotes 1/7th of his time responding to his superior, that leaves about 3/7ths of his time for individual work. With coffee breaks, that accounts for his eight hour day. What he does after hours presumably depends on how well he likes the allocation of his work day. That is important. Most of us are probably most productive after hours.

The organization is then automatic. At the top level there would be 1 leader; at the next level down 3; at the next 9; and so on. An organization of N people would thus have $n \approx \log_3 2N$ layers. For example, an organization of the size of Los Alamos, which has $N \approx 7{,}500$ total members, would ideally have $n \approx 9$ levels. For saturated connections the number would be $n \approx \log_7 6N \approx 6$, which is about the current number of levels in management at Los Alamos, in accord with the general observation that management is fully occupied managing. Using the rule of seven with only half the saturating number of subordinates would thus add about 3 levels to the current structure. The reason for the

difference is that the intermediate levels would be expected to do some work. If they do, a few more levels could produce both more product and better leadership.

III. RESPONSIBILITIES

In this organization each person would spend about half of his time responding to subordinates, half of his time doing research, and a small amount of his time responding to his superior. If the latter was done during lunch, that would make the fractions work out about right. That statement is not completely facetious. If a person has nothing to do but respond bureaucratically to his subordinates and bug his superiors, there is a built-in incentive to let those tasks expand to take up all available time, wasting the whole day in nonscientific activities.

If instead a person is expected to do some work himself, he has an incentive to maximize the time for that by crowding into the time that would otherwise be used for marginal bureaucratic interactions. If he doesn't feel an urge to do so, he is probably in the wrong organization.

Each person is expected to do some work himself, which is why time is explicitly set aside for that. It is hard to do science. It is easier, but less important, to manage it. Managing is a function that can be applied easily to any process: producing cars, IRS forms, sausages, etc. Science requires leadership more than management. Doing science, particularly applied science, requires insight and inspiration on which way to go, not just a daily reckoning of where you have been. Many organizations have quietly substituted management for leadership. The result is generally polarization, lack of commitment, inflexibility, the premature loss of scientific excellence, and fossilization, which are sufficiently familiar and uncomfortable to require no elaboration.

It is because of this distinction that this note's title uses leadership rather than management. It is a sign of the times and a portent of the future that the substitution sounds

awkward. For that reason the organization sketched above builds in tension at every level. Each person is expected to do both science and administration at every level except the lowest, which presumably contains the newest members, who need to be led, and the most dedicated, who refuse to be dictated to. Even the highest level of leader needs some time to respond to his leadership and develop goals for the Laboratory. And he has to respond to the legitimate requests of external sources of goals and support and summarize progress for them.

In this structure leadership is decentralized throughout, not concentrated at the top. It is those in the middle who would be expected to provide the bulk of the leadership, a task for which they should be suited by doing work of their own and hence retaining some instincts as to which directions those below them should go. In this structure each person is expected to function as a philosopher king, not just the one person at the top.

Centralization of information and decision-making at the top has been destructive to most organizations. The Greeks had a word for the notion that the best decisions can only be made on the basis of the fullest information at the highest level. They called it hubris. In a living scientific organization, decisions must be pushed down to the lowest level at which they can be sensibly made. Thus, leaders at each level would interact with their subordinates by encouraging them to make their own decisions if possible, making them on the spot, or taking them to the next higher level, if unavoidable.

Interactions of higher with lower levels should be for the transmission of goals, not just information or decision packages. Ultimately, goals in the form of insight and guidance are the only things that can be usefully passed down from above. In return, information on progress, success, or failure should be passed up and used as the basis for reward or correction of both people and projects.

IV. OBSERVATIONS

It is possible to take the rule of seven and use it to structure a scientific research organization. Coupling it with a partition of duties in which each leader is actually expected to contribute technically would add a few layers, but could recapture the productivity of those who have moved up in the organization. It would give each person an opportunity for leadership rather than just management and a responsibility for the creative work needed to provide the basis for effective leadership.

Such an organization would build in tension. Each person would be expected to do both science and administration at every level but the lowest. Leadership would be decentralized throughout, not concentrated at the top. That would facilitate decisions being pushed down to the lowest level at which they can be sensibly made. It would also facilitate the downward transmission of goals, the only things that can be usefully passed down from above, and make room for the upward transmission of results, which should be the basis for reward.

It should be obvious that this structure need not be imposed from above. There is no reason to await a decision from the top to do so. Everyone in the chain has the flexibility to organize his own life and thereby to decide whether he is to be a manager or a leader.