Perhaps many of you, like I, have been concerned by the instability of our times and confused with the ever mounting number of problems, the rapid pace of things, the growing dissatisfaction with a life in a period of affluence, and tensions between ages, classes, races, sexes, and groups increasing at an alarming degree.

The thought occurred to me that there perhaps has been one or more laws of nature in current operation which is responsible in large part for these confused and unstable times.

The outcome of my search has been the evaluation of what I have facetiously called "Altemeier's Aphorism". This law is based upon the idea concept that "It is not possible to solve a serious problem in nature without creating, in time, at least six more, which may be as bad or worse than the one solved." This concept has not occurred to me quickly, but rather has developed consequentially of observations, thought, and analysis. This is the subject which you have invited me to explore with you today.

Being good psychiatrists, you have probably already reacted and concluded that "it's wrong", "can't be", "it's too pessimistic", or maybe just that "he's crazy".

I hope you have since I would like to have your opinions before I publish this idea in a little book patterned somewhat after "The Pattison's Law", or "The Peter's Principle". The Lippincott Company has tried it on their writers and they have applied the law to a series of past subjects or events. They have become converts and have indicated their willingness to publish it and are pushing me to do so as soon as possible.

It all began to take shape in my mind when I was serving as Visiting Professor of Surgery at McGill University in Montreal one week before I had been called by the Professor of Surgery who told me incidentally that I would be called upon to speak on some philosophical subject of my choosing. I must admit that this prospect gave me a few cardiac extrasystoles.
After giving the matter some thought, I decided upon a talk exploring some of the untoward effects of the discovery and general use of penicillin during the preceding 25 years. The results of this exploration emphasized to me that even a great discovery like that of penicillin produced serious side effects or consequences, some of which were very serious perhaps or serious as the problem for which it had been developed.

This mixture reminded me of the saying, "There is no good without ill in the world, but everything is mixed in direct proportion." Also of a quotation I remembered of my translations of Cicero’s Treatises on Philosophy as a student.

Cicero - "if you pursue good with labor, the labor passes away, but the good remains; if you pursue evil with pleasure, the pleasure passes away and the evil remains."

In any event, there was the prospect that a pursuit of the effects of penicillin might be interesting, and the results of this effort make up the first chapter.

REFLECTIONS OF SOME MEDICAL AND NON-MEDICAL EFFECTS OF A QUARTER OF A CENTURY OF ANTIBIOTIC THERAPY.

For the solution of what problem was penicillin developed? Did its development just happen, or was its production meant for some specific purpose. The background of the development and use of both the sulfonamides and penicillin is interesting in this regard.

In anticipation of a possible World War II, Hitler appointed a commission headed by Gerhard Domagk to find a chemotherapeutic agent which would be effective against hemolytic Streptococcal and other infections which caused the death of 80,000 German soldiers from infections of gun-shot wounds of the lower extremities in World War I. He was successful in this search when prontosil and sulfonamide were rediscovered (9) after having been first discovered in Germany in 1911.

A similar search for an agent effective against the Staphylococcus was conducted in Great Britain by a research team headed by Doctor Howard Florey. Working with the mold Penicillium notatum and following the lead of Alexander Fleming's
observations made in 1928 (27), Florey and his group developed penicillin (28), and a new era of clinical antibiotic therapy began in 1942 and 1943.

It was on November 11, 1942, that I received the first shipment of penicillin as one of the seventeen responsible investigators appointed by the Office of Scientific Research and Development and the National Research Council to study and evaluate it. I can well remember the thrills experienced and shared in the months following, as the full impact of this new agent became evident. The miracles of recovery in patients with staphylococcal and streptococcal infections were almost unbelievable and probably were the principal reason for the emergence of everyone's hope and belief that the problems of postoperative infections would soon be solved by penicillin and other similar agents which would hopefully follow. Everyone was carried away, and the joke of the day was, "What do you give the man who has everything?" The answer was "Penicillin."

Within twelve months, however, several observations had been made in the cases we had studied, and I can well remember the keen personal disappointment that came with the realization that penicillin was not the answer to the problem of postoperative infections, and that it was going to bring to us other very serious problems.

What are some of these problems which have been caused by the widespread and indiscriminate use of penicillin?

1. Blind reliance and over confidence in the effectiveness of penicillin in preventing and controlling infections.
2. Breakdown in surgical conscience, surgical technic, and isolation technics.
3. Hospital Reservoir of antibiotic resistant and highly virulent bacteria.
4. Rapid increase in gram-negative infections with changes in the nature of infections with the growing substitution of Gram-negative agents for the original Gram-positive ones.
Other changes have included the following:

1. Superimposed or secondary infections developing during antibiotic therapy.
2. The increasing incidence of gram-negative infections by bacteria of low virulence.
3. Infections by Candida albicans and other fungi.
4. Association of an increasing number of infections with "L" forms and other atypical bacterial forms. Wound abscesses, abdominal abscesses, brain abscesses, and thromboembolic diseases are examples.

Gram-negative bacillary infections have become of greater frequency and importance during the past 15 years. Since the discovery and widespread use of penicillin and other antibiotic agents, gram-negative sepsis has become a serious threat in modern surgical practice. Between 1942 and 1956, two-thirds of the invasive wound infections seen in surgical practice were caused by gram-positive bacteria. Between 1956 and 1970, however, a fourteen-fold increase in the number of gram-negative infections occurred, and now two-thirds of the infections are of this type. A study of 480 patients with this type of infection, the causes of this increase were not clear, but they seemed to be related to the wide-spread and intensive use of antibiotics, the rapid extension of new and complex surgical operations and diagnostic procedures to elderly and other high-risk patients, and a series of iatrogenic factors.

The bacteria most concerned with this increased incidence of gram-negative sepsis were E. coli, Aerobacter aerogenes, Proteus, Pseudomonas aeruginosa, and Serratia, and their sources were the urinary tract in over half of the cases. The respiratory tract, the alimentary tract, continuous intravenous therapy, and various iatrogenic procedures followed in importance.

Of particular interest has been the observation that approximately 80 percent of these serious infections occurred while patients were on antibiotic prophylaxis.

In this regard there has been the suggestion that intensive or prolonged antibiotic therapy might be contributing to the development and increasing incidence
of this type of sepsis, including some cases by bacteria previously considered to have little or no virulence. During the past five years, for example, there has been a sharp increase in the number of cases of Serratia marcescens septicemia on the surgical services of the University of Cincinnati Medical Center. A retrospective and prospective study of 42 patients with this infection has been made, and it is interesting to note that 80 percent were also associated with antecedent or concurrent antibiotic therapy, often in large dosage. This may suggest that Serratia sepsis is an emergent secondary infection by an organism of otherwise low virulence or that antibiotic therapy depresses the patient’s resistance and permits invasive infections by such a microorganism.
The seriousness of this emerging infection is emphasized by its mortality of 40 per cent. The infection is of particular significance when it occurs in the debilitated surgical patient with predisposing or pre-existing diseases.

Of special interest was the observation in the first thirteen cases that eleven had developed spontaneously during intensive antibiotic therapy, during use of Keflin in three cases, and with penicillin in doses above 20,000,000 units per day in nine cases.

The association of upper gastrointestinal hemorrhage with sepsis by Serratia and other gram-negative bacteria has been noted in approximately one-third of the patients we have studied (13). The significance of this association is under further study.

Other examples of increasing numbers of infections now occurring in surgical practice are those caused by Candida albicans and Herpes. The latter infections have been noted in patients with severe trauma, such as burns, and in patients under immunosuppressive therapy.

These are well known to you, however, and I shall not dwell upon them further here. But what of other non-medical and social effects of the discovery and general use of penicillin in the last twenty-five years?

During my internship and residency in the 1930's and before penicillin, it was the usual and common experience to note that the productivity of many young girls in indigent families, particularly Negro, was often limited to one to three children. Further pregnancies were prevented or interrupted by venereal diseases, leading to sterility or repeated miscarriages.

After the introduction of penicillin in 1942, this was radically changed when it became possible to cure syphilis in one week, and gonorrhea in one to two days. Since then the indigent type of young female has frequently had four to ten or more children. This has contributed greatly to the increased population explosion, which also began in 1942-43, not only in the Americas but throughout the world.
By 1970, fifty per cent of the world's population will be twenty-one years of age or younger, according to recent estimates. The colored races are propagating at a relative rate of four times greater than the white race, leading to shifts in race population and to subsequent obvious political problems.

There has been an increased incidence of illegitimacy, and in large metropolitan areas it is not unusual for an unwed, promiscuous mother of various races to have six or more children by as many men, and often by unknown fathers. The steadily increasing number of such dependents has taxed the welfare budget of communities, but society has responded through Aid to Dependent Children, making it possible for unwed mothers to receive up to $600 per month for the financial support of their illegitimate children. This has become a way of life for a significant segment of our large metropolitan population in the Americas.

A large section of the youthful populations of large metropolitan areas has been and is being raised in hostile environments, and without regular, or even any, exposure to their fathers, the important authority figure for the teenage boy or girl. Mothers, interested or not, often cannot cope with the problems of discipline. The current man living with the mother may be an object of hostility of the young teen-ager, who soon seems to rebel against all authority.

It has been interesting and disconcerting to see the high incidence of recklessness and trauma in this group of young people who have been raised without paternal guidance and control. For example, last Friday in making rounds on our Trauma Unit, eight of nine young men, white and black, who had been admitted for gunshot wounds, stabbing injuries, or auto accident injuries, had never lived with or had never known a father. Six of the nine were school dropouts. Trauma, chiefly in the teen-agers, has become the leading cause of death in the United States between the ages of 1 and 35, and it is the third leading cause of death, surpassed only by heart disease and stroke, and cancer. (Similar problems in
China with its communal farms, Russia, with the children being surrendered to the State throughout the day while the mothers and fathers work, and Berlin, with its large population of fatherless children.)

It's hard to say how much penicillin and its effect on the population increase has had on the development of the contraceptive pill. Undoubtedly it has contributed indirectly with the "pill." Another deterrent to promiscuity and illegitimacy has been removed, along with the dangers and effects of the various venereal diseases. It will be interesting to watch the progress of deterioration of moral, ethical, religious, and legal codes, particularly in the American middle and upper classes, which has already started.

It should be pointed out that penicillin and other antibiotics have permitted the rapid extension of complex and new surgical procedures through the control of almost inevitable infections. It would seem that the frontiers of surgical treatment have been pushed back to a greater degree during the past twenty-five years than in the previous one hundred years. These spectacular operations have not been without their serious effects on our moral, ethical, religious, and legal ideas.

Perhaps these problems are not as closely related to penicillin as I have inferred, but there is no doubt in my mind but that a causal relationship exists and has contributed to the development and progress of these and other great problems facing us today.

As I reflect on the good and bad results of penicillin which we have experienced during the past quarter of the century, I am reminded of the wisdom of the old saying, "There is no good without ill in the world, but everything is mixed in direct proportion."

Cicero also summarized another aspect of this matter of good and evil by saying, "If you pursue good with labor, the labor passes away, but the good remains; if you pursue evil with pleasure, the pleasure passes away, and the evil remains." On reflection on these and projected problems, I am reminded of the
warning of I Corinthians, Verse 14 and following:

"A body is not one single organ, but many. Suppose the foot should say, 'Because I am not a hand, I do not belong to the body,' it does belong to the body none the less. Suppose the ear were to say, 'Because I am not an eye, I do not belong to the body,' it does still belong to the body. If the body were all eye, how could it hear? If the body were all ear, how could it smell? But, in fact, God appointed each limb and organ to its own place in the body, as he chose. If the whole were one single organ, there would not be a body at all; in fact, however, there are many different organs, but one body. The eye cannot say to the hand, 'I do not need you,' nor the head to the feet, 'I do not need you.' Quite the contrary: those organs of the body which seem to be more frail than others are indispensable, and those parts of the body which we regard as less honourable are treated with special honour. To our unseemly parts is given a more than ordinary seemliness, whereas our seemly parts need no adorning. But God has combined the various parts of the body, giving special honour to the humbler parts, so that there might be no sense of division in the body, but that all its organs might feel the same concern for one another. If one organ suffers, they all suffer together. If one flourishes, they all rejoice together."

It would be incorrect to imply that penicillin therapy was solely responsible for these problems, but I believe it has had a definite causative effect.

In summary -- the problems created by the use of penicillin are:

1. Blind reliance and over confidence
2. Breakdown in surgical conscience, surgical technic, and isolation
3. Hospital reservoir
4. Sensitization of 20 per cent of population
5. Rapid increase in gram-negative infections
6. Changing patterns of infection

Non-medical problems:
7. Rapid cure of gonorrhea and syphilis contributing to population explosion
8. Rapid increase in relative per cent of illegitimacy and youth population with their resulting problems
9. A.D.C. as a way of life
10. Beginning of the sex revolution

Of these #3, 6, 7, and 8 probably will have a greater problem effect on society than the original Staph. infections would have.
Problem:
Infestation of Jamaica by black rats from ships became so numerous in the period between 1750 and 1850 that they became an economic hazard as the result of their eating as much as 1/5 of the sugar cane crop.

Solution of the Problem:
1762 - The purposeful release of voracious ants capable of destroying the black rats.
1790 - Release of giant toads to eat the voracious ants which had become a problem also.
1872 - The planned release of 4 wild and 5 wild female mongooses native to India.

Problems Created:
When Christopher Columbus, on his second voyage, dropped anchor off the shore of Jamaica in 1494, this island was in natural balance with the elements of nature. In the next 200 years, the white man turned this island into a cosmopolitan hodgepodge of strange organisms from many parts of the world. Thus, Jamaica, as an isolated island, suffered through a long list of "improvements" at the hands of well-meaning men who compensated in imagination for their lack of ecological knowledge.

Black rats brought by the ships became pests, and lead to the urgent necessity of developing a method for extermination.

The 9 wild mongooses released in 1872 by Mr. W. B. Espeut, soon had to find a diet other than cobras present in his native India. His choice of food at any given moment seemed to be related to abundance. Whatever is moving and
small or large enough, he takes.

Once turned loose in the cane fields of Jamaica, the mongoose had his work cut out for him and he went right to it. In six months, the losses to rats had been cut to a mere fraction of what they had previously been. Within the next few years, these carnivores became established as a permanent resident and in a single decade took up occupancy throughout the island, creating the following problems:

1) Working class people depended upon their garden patches and their flocks of poultry became the victim of the talents of the mongoose in destroying poultry, ground nesting birds, lizards, and yellow snakes which was also a predator of rats.

2) Shortly, the native iguana was extirpated from all but remote corners of the island.

3) Land crab population fell drastically.

4) The destroying of young pigs, kids, lambs, kittens, puppies, game, birds which nested on the ground, snakes, ground lizards, frogs, turtle eggs.

5) Its appetite turned to eating ripe bananas, pineapple, corn, avocados, sweet potatoes, coconuts, and other fruits.

6) The destruction of insectivorous birds, snakes, and lizards was followed by an increase in several injurious insects, particularly ticks, which became a serious menace.

By 1890, a commission appointed by the government showed conclusively that the evil results of the introduction of the mongoose outweighed the benefits rendered to sugar and coffee plantations.
Records show that in 1892, the rumor had spread that the United States Department of Agriculture planned to import the mongoose for release in western states where gophers were a problem in the cattle country. Appalled scientists familiar with ravages of the mongoose in Jamaica were able to prevent this, but only by most "strenuous efforts". The mongoose therefore did not gain a foothold on the North American continent, but it came so close that naturalists were thoroughly shaken by the episode.
JOHN L. LEWIS AND THE
COAL MINER'S PROBLEM

The Problem:

The destitute, dangerous, and unfortunate plight of mine
workers during the early quarter of the 19th century.

Solution:

John L. Lewis, as President of the United Mine Workers of
American for 40 years, provided the solution through militant
union activity. He led the fight of the coal miners from a
position of strength and force demanding the rights to which
free men are entitled, and he used the following methods.

1. Organization of mass production industries on an industry
   rather than a craft basis.

2. He started the C.I.O.

3. Through crippling strikes he brought the country as well
   as industry to their knees.

Resulting Problems:

1. Crippling strikes in 1935, 1937, 1939, and 1941 brought a
   $7.00/day wage, 35-hour week, and union shop to the miners.

2. In the next five years and during World War II there were
   eight U.M.W. strikes causing the government to seize the
   mines on a number of occasions.

3. In the U.M.W. 59-day soft coal strike in the spring of 1946,
   the government seized the mines and the U.M.W. signed a
   contract for $.18½ per hour increase and other benefits.
3. (Continued)

Lewis charged the government with breach of contract and called another strike in November 1946 despite a federal court restraining order. On December 4, he was personally fined $10,000 and the U.M.W. fined $3,500,000 for contempt of court.

4. The strikes produced transportation paralysis during critical periods of the War, polarizing thought that something needed to be done to control or prevent crippling transportation and industrial problems.

5. Mechanization of the mines.

6. Conversion of coal locomotive to diesel locomotion as a means of avoiding crippling transportation during strikes.

7. Change to oil and gas energy by industry and homes (Heating).

8. The destitution of the Appalachian area.


Comment:

Items 7, 8, and 9 were serious problems for the miners which, in the long run were as serious or more serious than the original problem which John L. Lewis set out to solve.
D.D.T.

The Problem:
In current society a solution to the problem of insects was needed for the control of too many insects, particularly during plagues, financial losses of money and crops, and personal discomfort.

Solution:
The solution of this problem was sought through the development and introduction of insecticides, notably DDT.

Resulting Problems:
Disturbance of ecology and serious imbalances in the interrelationships of animal species.
1. Massive kills of desirable species of animals.
2. Failure of the brown pelican along the gulf coast and Southern California to reproduce because DDT affects shell thickness and eggs break in the nest.
3. Starfish explosion.
4. Toxic reactions and death of fish feeding on poisoned insects.
5. Major killing of haddock fisheries.
6. Serious effect on the fruit industries because of DDT death of bees and failure of cross-pollenization.

Comment:
It is difficult to say which of these six problems are the most serious, but the general alarm has been sounded to rectify the problems caused by DDT.
THE PILL

The Problem:

The population explosion throughout the world has posed serious problems effecting the survival of the race on this planet by the year 2,000 A.D.

Solution:

The obvious would be through birth control. People being what they are a physiological, cheap, and easily administered method of birth control was sought. A physiological one using the pill was introduced, accepted, and widely used with the drastic reduction in the birth rate.

Resulting Problems:

1. Sex revolution.
2. Rapid increase in venereal diseases.
3. Threats to the survival of the family unit.
4. Increased incidence of thrombophlebitis with increased overall mortality from thromboembolic disease per 1,000 women on the pill.
5. Increased incidence of breast cancer, particularly in younger patients.
6. With the probable etiologic relationship of a virus with cancer of the cervix, the current promiscuity of young females should lead to a significant increase in the incidence of carcinoma of the cervix in the next 20 years.

Comment: Of these resultant problems, #1, 2, and 3 are probably the most serious.
CURRENT PROBLEM - "DOCTOR SHORTAGE"

It is estimated that we need 50,000 more doctors to meet the current needs of society.

That 40,000,000 United States citizens are without a physician.

That the inner city and rural areas are particularly in need.

SOLUTIONS - Congress is acting to:

1. Increase number of medical schools from 83 to 104
2. Increase classes to produce more physicians, increase building
3. In Ohio
   a. University of Cincinnati classes presently 110 going to 192 with graduating classes of 192 by the year 1978
   b. Ohio State 250
   c. Case Western Reserve
   d. Toledo
4. The number of doctors graduated by 1978 will be 750 per year each year.

PROBLEMS THAT CAN BE ANTICIPATED

1. Too many doctors will be produced. By 1980 the market will be "glutted". The same program in Russia and Chile gave too many doctors. 1 out of 4 doctors in the world are behind the Iron curtain now.
2. More faculty will be required
3. Current curriculum will have to be changed. Education period will be shortened to three years.
4. Cost of medical education will be increased beyond the capacity of Universities to meet.
5. The quality of doctors will decrease.
6. The quality of care will decrease
7. There will be so many physicians that cost of fees and medical care will decrease.
8. There will be so many physicians that they will have to practice in the inner city and countryside.
9. Federal restrictions on
   a. Number of medical students
   b. Number of residents
   c. Types of residents (phasing out of trauma grants)
11. Decreased research
12. Delivery of care will suffer.

COMMENTS - PROBLEMS 1, 4, 5, 8, 9,

1. Conditions worse than present circumstance
2. Has Congress really solved the problem
3. Have they really even defined the problem

Congress has not really solved the problem but has created more problems, some of which are of greater magnitude than our current one.

Do we really have a doctor shortage?

Crisis and apathy
### TABLE I

**TABLE OF RATIOS LICENSED PHYSICIANS PER POPULATION IN THE UNITED STATES**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>POPULATION</th>
<th>NO. OF PHYSICIANS</th>
<th>RATIO OF ONE PHYSICIAN TO POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>132,594,000</td>
<td>187,669</td>
<td>1:707</td>
</tr>
<tr>
<td>1945</td>
<td>140,468,000</td>
<td>210,183</td>
<td>1:668</td>
</tr>
<tr>
<td>1950</td>
<td>152,271,000</td>
<td>232,697</td>
<td>1:654</td>
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<tr>
<td>1955</td>
<td>165,931,000</td>
<td>255,211</td>
<td>1:650</td>
</tr>
<tr>
<td>1960</td>
<td>180,684,000</td>
<td>274,834</td>
<td>1:657</td>
</tr>
<tr>
<td>1965</td>
<td>194,592,000</td>
<td>305,115</td>
<td>1:638</td>
</tr>
<tr>
<td>1970</td>
<td>205,400,000</td>
<td>335,396</td>
<td>1:612</td>
</tr>
<tr>
<td>1975</td>
<td>216,500,000</td>
<td>365,677</td>
<td>1:592</td>
</tr>
<tr>
<td>1980</td>
<td>229,500,000</td>
<td>395,958</td>
<td>1:580</td>
</tr>
</tbody>
</table>

Estimated figures are underlined
SUMMARY

1. As we attempt to solve serious or complicated problems, we automatically create more problems.

2. As more problems occur, more demands are made that we address ourselves to them.

3. Social and economic unrest with a high rate of frustration and imbalance develop.

4. As problems mount there comes the administrative drive for action by committee and government.

5. Too many committee meetings occur which tend to be ineffective and wasteful of time and energy. In Medicine, this trend takes the physician away from patients and the practice of medicine, away from the student and required teaching, and away from research.

6. Continuation of this trend must lead to criticism of academic medicine by students, society, and administration.

7. As man attempts to solve problems, he is more often meddlesome than not. With inadequate forethought, he generally creates more problems which, in turn, must be solved and which, in turn, create their own set of special problems.

8. Thus, attempted problem solving increases the pace of things, disturbs interrelationships of man, groups, and races, imbalances states of equilibrium in nature, and in some instances may lead to serious threats to the survival of man.
9. Failure to arrive at definitive solutions has produced a 
natural overdependence or subjugation to the necessity of 
federal control.

10. Federal control, accomplished and potential, is headed toward 
the over-production of physicians, decreased quality of the 
practicing physician, decreased quality of medical practice, and 
control of the number of specialists to be educated and their 
method of practice.