

SCIENTIFIC THERAPY AND PHARMACEUTIC RESEARCH.*

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The growth of scientific therapeutics is as romantic a series of tales as ever captured the attention of a novelist; it is filled with dramatic incident. What could be more dramatic than the struggle of Paul Ehrlich until his success was crowned by the discovery of arsphenamin? What great climax in human life ever approached the scene in which Pasteur demonstrated to the doubters of France that the sheep that had been inoculated lived and those that had not had preventive injections against anthrax died? Were ever human sympathies more touched than by the story of the fight to get antitoxin into stricken Nome? And equally dramatic, though perhaps more tragic, is the story of the discoverer whose new preparation seems to him to be a marvelous specific, but who passes at last, after several years of trial, into the oblivion that is the fate of those who fail. It may be true that the romance of medicine, and especially the history of materia medica, will show many more failures than successes. Within our own memories are the hundreds of cures for tuberculosis, for cancer, for locomotor ataxia and for general paralysis that are now buried beneath tons of soil with victims that they were to cure and, in some cases, with the dollars of the manufacturers who thought they would cure. But above them rise the monuments to diphtheria antitoxin, to arsphenamin, to quinine, to digitalis, to ether, to the local anesthetics, to morphine and to the many other remedies that have alleviated pain and illness and postponed death.

THERAPEUTIC NIHILISM.

In writing the history of our progress in scientific therapeutics, we like to believe that a proper attitude toward the claims made for remedies began to develop with the beginning of the twentieth century. Indeed, a study of the origin of the phrase "therapeutic nihilism" would probably show the beginning of its vogue at about that time. But therapeutic nihilism is not the property of any recent or single period in our history. There were the high priests of Israel, who doubted the healing virtues of the golden calf; there were the biting aphorisms of Celsus, who questioned what he could not see; there were even the experiments of Albrecht von Haller, who anticipated Hahnemann in the desire to test drugs to see what they would do before admitting that they would do anything. In fact, the nihilism of our contemporary period is not an attempt to destroy belief in the value of drugs, but an attack on an outrageous commercialism in the sale of therapeutic substances, which unfortunately, perhaps, serves also to undermine to some extent belief in all drug therapy. It seems likely, rather, that the growth of therapeutic nihilism in general was the result of the great advance in our knowledge of the causes and pathology of disease and the increasing attention paid to these matters rather than to treatment, in our medical schools. It has been said that medicine as an art of healing the sick has given place to medicine as the scientific study of disease.

To-day the trend of opinion is turning against therapeutic nihilism; there is a

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call for the return of that older type of physician in family practice whose primary function was the alleviation of pain and the healing of illness. And that newer trend is the result not only of a changing philosophy as to the functions of the physician but equally to that very scientific study which, for a few decades, caused some to doubt the virtues of their remedies.

In the *materia medica* of fifty years ago, drugs were classified by certain definite effects which they produce on the system of the human body: stimulants, depressants, cathartics, diuretics, sudorifics, germicides and parasiticides. Finally, there were the alteratives, which presumably produced certain effects, but just how or why no one knew. The therapy of to-day includes such of these alleviators of pain and these modifiers of the physiology of the body as scientific pharmacology has shown to have real merit. But it also attacks disease by providing substances that produce the death of the specific organisms responsible for disease, by activating the tissues of the body to fight disease and by providing substances that fill functions in which the tissues are apparently deficient.

THE VIS MEDICATRIX NATURÆ.

There seems to be inherent within the cells of all living substances a "will to live," a tendency toward recovery from disease, the *vis medicatrix naturæ*. This salutary activity of the organism is the secret of the success of those cults that occupy the twilight zone of medical practice. "The *vis medicatrix*," says Sainsbury, "has floated many a false system of medicine, including some very heavy craft: *it* has cured, *they* have claimed." On the *vis medicatrix* are based the alleged successes of such cults as chiropractic and Christian science, of theosophy, of Couéism, of zonotherapy and, indeed, of every cult that is essentially a system of treatment based on a single idea as to the causation of disease without relation to the proved facts of medical science. These cults, known as the nonmedical, or drugless, cults, have delayed scientific progress through their attacks on scientific experimentation, particularly on that which involves the use of animals, and unquestionably have been responsible for the spread of epidemics and for a certain proportion of mortality from disease. Granted that there are instances in which the wrong use of drugs may have hastened death, there unquestionably are many more instances in which the lack of the medicament—the failure to apply the remedies of science—has resulted in anguish to the sufferer and in the spread of disease.

It must not be thought, however, that medicine has been sinless in its consideration of this special property of the living cell. Until the science of biometry taught us something about the evaluation of clinical statistical evidence, we were far too ready to give ourselves the credit for that certain percentage of cases of disease that recover not only without treatment but frequently in spite of treatment. The patient is given a remedy and improves. The clinician considers that the patient improves, not through the *vis medicatrix naturæ*—the snare that easily deludes the cultist but should not entrap the scientist—but because he has been given the remedy. If scientific medicine had not recognized this difficulty over many years, the saying "post hoc ergo propter hoc" would not have become a proverbial sneer at the conclusions of clinical medicine.

EVALUATING CLINICAL EVIDENCE.

Edwin Bramwell, professor of clinical medicine in the University of Edinburgh, recently remarked succinctly that "the ultimate proof of the value of any remedy can only be established at the bedside. * * * Hypothetical considerations and the results obtained by laboratory workers are invaluable," he says, "because of the possibilities and indications they suggest, but the clinician is responsible for the final evidence." This is a statement which is invariably greeted with applause by those whose proposed remedies have met with disaster when submitted to the scientific experimentation of the pharmacologist in the laboratory. And their applause no doubt is based on the fact that they have on hand hundreds of letters from so-called clinicians to prove that the remedy which the pharmacologist found unscientific and unreliable has met in their hands with remarkable success. Nothing is so difficult to evaluate as clinical evidence. Sir William Osler wrote: "It is so much easier to believe than to doubt, for doubt connotes thinking and the expenditure of energy and often the disruption of the status quo. * * * In the matter of treatment, the placid faith of the believer, not the fighting faith of the aggressive doubter, has ever been our besetting sin." Nevertheless, as Dr. N. V. Dale of the British Medical Research Council has asserted, the intelligent use of a drug does not mean that the practitioner must have a full scientific appreciation of the mode of the drug's action. Who knows to-day the manner of action even of quinine, a remedy established by centuries of clinical use? Who has even an inkling of the processes involved in Roentgen ray and radium therapy? Who can even approximate the facts regarding the activity of the vitamin? Since all of these substances are without doubt potent, who would say that the use of such substances should be avoided until the complete explanation becomes available? No. Scientific medicine does not ask proofs of this character. It does ask that the use of the remedies be established within the limits of the science of pharmacology and that the clinical evidence be so controlled as to meet the ordinary tests applied to so-called scientific evidence.

The pharmacologist considers first the composition of the remedy and the established knowledge of the past as to its various components. He then attempts by experiments on animals, under controlled conditions, to determine its effects. Having satisfied himself by animal experimentation that the remedy has definite virtues, and that it is harmless in the quantities used, he turns to it the alleviation and control of disease in man. Now this matter of possible harm to the patient from an unestablished remedy is a most important one. The time honored aphorism "Primum non nocere" expresses in three Latin words the caution to the physician "First do no harm."

There was a time when our therapy was dominated by faith, by incantations, by charm, and by symbolism. In the dark ages of medicine, the words that went with the concoctions of dried beetles, snake oil, mandrake root and herbs brewed in the light of the moon at midnight were considered quite as important as the remedies themselves. From this we passed into the age of the "dreck apotheke," with its combinations of all the noxious excretions and secretions known to man. Against this, Hahnemann reacted, and no doubt the homeopath with his dilutions of drugs to the two millionth part did less harm than Rush's thunderbolt with its massive doses of calomel and jalap. True, William Withering had established

digitalis, Jenner had established smallpox vaccination, mercury had been found for syphilis—a true science of pharmacology was beginning to win its way. A Lister showed the importance of antiseptics and the possible harmfulness of too rigid antiseptics was replaced through the discoveries of Pasteur, by a safe and satisfactory asepsis. And so at last we came to the new era of therapy introduced by Paul Ehrlich, the era of specific chemotherapy.

In this transition over the centuries, the position of the physician in relation to his patient changed also. Look at the pictures drawn by famous artists. Here is the doctor of Luke Fildes' famous picture; he sits at the bedside of the child dying of diphtheria. Possibly he will decide a little later to do a tracheotomy, to try to suck out the membrane or to prescribe a little tincture of iron. He, too, is, after all, doing no harm. But if the pictures were of our day he would be doing a great deal of harm by his inactivity. He ought to be taking a throat culture to confirm his diagnosis of diphtheria, and he ought to be injecting diphtheria antitoxin and possibly he ought to be putting in his spare time by immunizing the other members of the family who should not be in the room anyway. Our aphorism "*Primum non nocere*" means, therefore, "do no harm by withholding a proper remedy." Let us assume, for example, that one withholds atropine in an inflammation of the eye, and thereby permits permanent scarring and loss of eyesight. Here the one responsible for treatment does as much harm as he would have done if he had given a wrong drug. There is a need for "positive treatment" which means the employment at the earliest possible moment of those remedies which have been established as beneficial in the condition concerned.

SPECIFIC THERAPY AND CHEMOTHERAPY.

If ever the warning "*Primum non nocere*" were needed in medical science, it is needed in the judgment of the new and potent remedies which science has developed for the treatment of disease. We know that insulin acts, because it can act for harm as well as for good, and this applies as well to arsphenamin, to antitoxins for scarlet fever and diphtheria, to our sedatives, and to our dye substances. These preparations must eliminate the invading organisms but must not harm the patient. We have had presented to us a long series of numbered combinations of metals with organic radicals, of metallic substances with dyes, and similar preparations. Such terms as "606," "909," "Bayer 205," "Fournneau 309," and "Mercurochrome 220," representing hundreds of trials before the achieving of even possible success, have become familiar to most physicians. In the case of some of these remedies, we find that they not only kill the bacterial organisms for which they are presumed to be specific without harming the body of the patient, but also, apparently, render the body in which they are injected resistant to other infections. In many cases, the serums and extracts of the organs of such animals also exert curative effects. As can be demonstrated in the test-tube, the drugs themselves do not have the power to destroy the organisms, but when these drugs are taken, or injected, into the body and combine with the blood and the tissues, some change takes place which results in destruction of the parasite. There are preparations of bismuth which will not act when used alone, but which become exceedingly potent when mixed with extract of liver tissue. Here the tissues are the activating factor. Dale has observed that an amebic infection which readily yielded to

emetin in man could not be so controlled when transferred to the cat. Something in the tissues of man that activated the emetin was absent in the tissues of the cat. Here, then, is that *vis medicatrix naturæ*, that power within the body which may itself come forth some day in the form of a hormone, or a vitamin, or an endocrine substance, or what not. And if it does, some manufacturer who follows the Council on Pharmacy and Chemistry will give it a new name that correctly labels its composition, and that is just as hard to pronounce as *vis medicatrix naturæ*.

In studying the power of the body to resist and overcome disease, the impression has become firmly established that much depends on the cells being in a normal healthful state. It is known that this condition of the cell may be modified by foreign substances injected into the body such as non-specific proteins; that certain poisons definitely inhibit the actions of certain cells; that substances such as insulin activate certain cells to perform unusual functions. Every great discovery in medical science is followed promptly by a series of investigations along similar lines, and only too often reasoning by analogy leads to therapeutic abuses or still more likely to therapeutic fads. The discovery of a substance like thyroxin or insulin is the warrant for the entire gamut of glandular organic extracts, singly, in mixed powders and in glandular soups. And there is as much reason for the use of some of them as there is for the belief that a kidney stew will cure interstitial nephritis. The proof that intravenous injection of one remedy will yield a positive and swift result is taken as warrant for a whole battery of self-loading, rapid firing syringes with ammunition wagons full of ampuls in reserve. It is suggested that the secret lies in the use of colloidal substances, although so far no actual knowledge is available to support the use of colloidal substances. And while we know that the vitamins do something because certain things happen when they are absent from our diet, we know little as to what might happen when any considerable amount of such substance becomes an exceedingly large part of our diet. We know that suggestion may play a large part in what we do and in what we think about what we do, in what we feel and in what we think about what we feel; and if we are Freudistically inclined, the less we think about it the better.

THERAPEUTIC ACCURACY.

It would seem, then, that the prime need in therapeutics as a science is the need of all sciences, namely, accurate methods of measuring results and of evaluating effects. The lack of such methods obviously has resulted in marked differences of opinion between those who have the "will to believe" and those who demand to be shown. Consider in this connection the hypnotics and sedatives. If there were some method of measuring the value of such preparations similar to the methods that exist for determining the potency of preparations of digitalis, of parasiticides, or of antitoxins, there would be no question as to the relative merits of the hundreds of preparations of this character that are available and that are being made available to the medical profession. Instead, the only scientific methods that have been elaborated for properly testing such preparations involve the interpretation of subjective phenomena with no exactitude, and the use of animal behavior tests that have little or no application to the problems of controlling pain in the human being. As a result, the clinician is besieged with the claims for hundreds of substances the names of which end in "al," including medinal, luminal,

dional, barbital and neonal. So far as the various members of the barbital series are concerned, there would appear to be practically no limit to the preparations and combinations that might be derived from barbituric acid. Very likely there is a vast difference in power of action, in toxicity, in by-effects and in other particulars between the worst and the best of the series. But obviously there is a score of substances near the top of the series, therapeutically, that differ from each other but slightly; and there is to-day no method known to medical science for determining the exact scope of that difference. Such being the case, no body of scientific men, such as the Council on Pharmacy and Chemistry, will be able to permit unwarranted distinction between such products, and it certainly must hesitate to lend its warrant to the exploitation of any considerable number of such preparations with individual names that completely hide the source of their derivation.

THE CLAIMS FOR PHARMACEUTICAL PRODUCTS.

The manufacturer may well raise the question as to the extent to which purely scientific considerations may limit the number of products that are sold. Any one who has watched the development of the catalogs of various proprietary manufacturing houses knows that each organization wants to have in its list substances to meet the various indications that may arise in the practice of a physician. It even has been intimated that some firms have copied the catalogs of others. Every manufacturer wants a laxative like phenolphthalein, a sedative of the barbital series, an antiseptic similar to compound solution of cresol or to surgical solution of chlorinated soda; he wants a digitalis preparation, a tonic preparation containing iron, a bismuth preparation to be used in syphilis; an agar and oil preparation, an oil that is all his own, and so on down the list. He wants, in short, to be able to provide his representatives with a complete line, and no scientific physician will deprecate this wholly estimable desire on the part of the manufacturer. If a manufacturer has created a name for his organization that stands for reliable pharmaceuticals prepared in convenient packages, it is well that physicians recognize the worth of such a reputation and that they depend on such a manufacturer for their drug products. Apparently, however, manufacturers are not willing to sell the name of the firm alone. Furthermore, there are many corporations which deal not in complete lines, but only in specialties. Obviously, the man who is selling a specialty feels that he must make claims that will convey to the physician the idea that for its purpose the specialty is far superior to the product issued as a part of the line of other manufacturers.

Notice, for example, the preposterous extent to which this tendency was carried in connection with the sale of preparations of liquid petrolatum—so-called Russian or mineral oil. Obviously, every manufacturer could find a preparation of mineral oil that would vary in its specific gravity, in its transparency or in some other minor manner from the preparation prepared by some other refiner. But when the clinical test is applied, and, indeed, when clear light of pure reason is applied to the extraordinary claims made for such preparations, they are found in most cases to be even thinner than water. In the development of this specialty, the attempt seems to have been to find, first, some non-essential quality that would support the claims, second, an attractive name, and third, some physicians credu-

lous enough to believe the claims and to support them with evidence. Certainly, oil, both internally and in the well, has much to answer for.

THE SCIENTIFIC INVESTIGATOR OF COMMERCE.

The statements just made should not be taken in any way as a depreciation of the work of the commercial chemist and pharmaceutical investigator. I am not one who believes that it is impossible for the scientist in the employ of a large corporation to produce investigations that are on a par with the best type of investigation done in university laboratories. After all, the commercial chemist and pharmacist is merely the scientist of the university transported to a new environment and compelled to give thought to practical considerations that do not, perhaps, disturb him when within the cold walls of some sanctum of learning. But it is unreasonable to believe that an honest man must be dishonest in any circumstance. After all, honesty is a state of mind not the particular property of any chosen group. It is a pessimistic man indeed who believes that outside the walls of universities there exist no scientists who are not corruptible. The debt of the public to the investigators of commerce is no slight one. The research investigator in his laboratory is able to produce some new medicament like insulin or scarlet fever antitoxin or thyroxin on a scale that enables him to treat a few patients at a considerable cost. The investigator in commerce substitutes production in tons for production in grains and thereby makes available to the poorest invalid the life-saving remedy that might otherwise be given only to the wealthy few. The process that produces the remedy in the individual laboratory is, as we all know, not immediately adaptable to quantity production. The isolation of the active product is only an indication of the problems that must be surmounted for commercial distribution. Here such matters as the mass of raw material, preservation, and convenience of dispensing must be considered. Indeed, it has been found occasionally that the method by which a product was evolved in the laboratory would not even yield a similar substance when applied on a large scale for commercial purposes, so that entirely new methods had to be devised before the product could be made available to the public. And these methods are worked out by men whose names remain hidden forever in the secrecy of the commercial world, whose names do not appear in the periodicals of scientific research, but whose contribution is, perhaps, just as great and just as important in the long run as that of the investigator who first brings the substance to medical attention.

THE OUTLOOK FOR THE FUTURE.

As one looks over the accomplishments of the past, one need feel no pessimism regarding the future of scientific medical therapeutics. Such harm as is not inherent in human nature itself is slowly but surely being eliminated from the manufacture, the sale and the use of our remedies. More and more we are beginning to realize that the prime function of the physician is not the prevention of death, for death can never be prevented completely, and ultimately the mortality will always be one hundred per cent; not the raising from the dead of tissues or of human beings that have succumbed, for outside of biblical legend and the phantasies of those who claim there is no disease and who heal by the mind alone or by the laying on of hands, there is no raising from the dead—rather, the function

of the physician is to range himself on the side of life, by seeking to establish those conditions which are most favorable to life. These conditions he establishes through the employment of all those agencies which, scientific experiment has taught him, have the power to modify the actions of human tissues. These agencies include not only the drugs and biologic preparations of *materia medica* but also heat, cold, massage, electricity, water, sunlight and the mental suggestion of our therapeutics. With these agencies he aids the power within the body to overcome disease or he so modifies the constitutions and environment of the bacterial organisms that attack mankind, that they depart either their lives or his system.

The outlook for the future in the control of disease depends, therefore first, on the acquiring of more knowledge as to the biology and physiology of man, and particularly of the individual cells within the body of man; and second, on a study of the natural history of disease, including particularly the biology, physiology and chemistry of the bacterial organisms that produce disease.

The finding of dye substances that are specific for certain bacteria, of anti-toxins specific for certain diseases, of glandular extracts that replace missing secretions and activate latent cells to action; of substances such as the phthaleins that search out certain tissues like the liver or the kidney, or that carry antiseptic actions to certain secretions, as in the case of methenamine or hexylresorcinol—these are refinements of therapeutic science that are as astounding as the radio and the wireless telegraph.

In his "Principia Therapeutica," which is to the practitioner a sort of guide-book through the Hades of therapeutic fallacies, Sainsbury opens with a dialog between "Therapeutics" and "Pathology." The scene is the postmortem room and the pathologist is busily engaged in examining a dead body. With the typical cynicism of the pathologist—the analytic philosopher who renders the final materialistic verdict—this necropsist begins by wondering at the faith of the physician in his drugs. Digitalis, strophanthus and spartein had been given; yet the aortic valve was narrowed, and the valves were fused and thickened. "Did you think to soften them?" asks the pathologist. The fibers of the heart muscle were stretched and degenerated. "Did you propose to make new fibers to overcome the destruction?" asks the pathologist. Fortunately, the physician is able to make a most convincing answer. "My attention took note of this only," he says, "that the heart did beat, and the circulation of the blood was maintained, however imperfectly. This rhythmic contraction of the muscle fiber had no sort of relation to those elements of degeneration within its substances—they were of death, but this was a living act, maintained in spite of all and every adverse circumstance, and to aid and abet this vital residuum, setting aside all thought of the elements of degeneration, mere mortal remains fit only for interment—this was my one endeavor."

This service to the living, this utilization of every potency and of every atom of scientific knowledge available to aid the power within the human body in its fight against death, commands all that the physician has to give of his learning and of his spirit. Behind him stand those who are charged with the preparation of the remedies that he is to use; and between him and them, those who would help him in his hour of need to select wisely. It has been our hope that this intermediate group, represented by the scientific pharmacologists, the teachers of therapeutics, the bacteriologists, the medical writers and journalists and the Council on Pharmacy

and Chemistry, might work more closely with those who prepare our remedies so that the physician might feel safe in every instance in trusting the preparations and the statements made about the preparations of at least a considerable number of manufacturers. With such coöperation we may approach nearer and nearer to that time when the rebuke of Paracelsus to the faint hearted physician may be warranted in fullest measure.—Translated: "Never must the physician say, the disease is incurable. By that admission he denies God, our Creator; he doubts Nature with her profuseness of hidden powers and mysteries."

COMMONWEALTH STUDY OF PHARMACY.

This is the seventh of a series of monthly statements issued by the staff conducting this study.

Since the study as now being conducted revolves largely around the filling of prescriptions it may be interesting to know what is being done on the subject of compounding.

There is a general feeling that prescription filling to-day consists very largely of a simple process of transferring from one container to another and that the ingredients of such prescriptions are largely proprietaries. If this were true, the pharmacist would need to know more about proprietaries, and the necessary knowledge of compounding problems would be reduced. Among other studies relating to compounding were the following:

1. At the outset in order to determine whether the study should be confined to official ingredients in prescriptions we studied 1000 prescriptions selecting at random 100 prescriptions from ten states. Following are the results:

- (a) 51.9% contained only official ingredients
- (b) 29.0% contained both official and non-official
- (c) 19.1% contained only non-official ingredients.

2. For the same reason as above stated a second study of 1000 prescriptions was made showing the following results:

- (a) total number of ingredients—2680
- (b) of these 81.4% were official, 18.6% non-official.

NOTE: Non-official—anything not U. S. P. or N. F., including proprietaries.

3. The ingredients of 17,577 prescriptions were tabulated as the study progressed and the results while varying slightly from the study of only 1000 prescriptions made earlier are even more striking. Of the 40,454 items in these 17,577 prescriptions

- 77.8% were U. S. P.
- 5.4 were N. F.
- 6.8 were non-official, but not proprietaries
- 10.0 were proprietaries.

4. When the tabulation of types of ingredients in the 17,577 prescriptions had been completed it was noted that a number of classes of galenicals such as Emulsions, Suppositories, Ointments, etc., appeared very seldom. The component parts of these classes appeared but were tabulated separately. It therefore

became necessary to make another study of the prescriptions to determine just how many times the pharmacist actually was called upon to compound galenicals as mentioned above. A study was made of 10,000 prescriptions taken from the 17,577 previously studied with the following results:

Of the 6384 liquid prescriptions, 20.6% required only the filling of one bottle from another; 79.4% were mixtures that called for some skill.

Of the 1170 capsules (all kinds), 3.8 were proprietaries and would be bought while 92.6 should have been filled by the pharmacist.

Of the 881 powders, 4.2% were proprietaries while 95.8 should have been prepared by the pharmacist.

Of the 679 ointments 14% were proprietaries and 86% should have been made by the pharmacist.

* Of the 481 tablets all would be purchased. The same was true of the 149 tablets triturations.

* Of the 144 pills 54.8 would be purchased, and 45.2% should be made by the pharmacist.

* Of the 76 suppositories 31% would be purchased and 69% could be made by the pharmacist.

There were 22 prescriptions for Konseals, 4 for Cataplasma and 1 for a tube of tooth paste, all of which the pharmacist would make. There were 5 prescriptions for troches and 2 for ampuls which would be purchased.

From the above it is apparent that compounding is not a lost art. The filling of prescriptions is not, as many now believe, largely a matter of transferring a proprietary or secret formula preparation from one container to another.

The information and skill necessary to do the compounding involved in these prescriptions is being worked out by Prof. Louis Saalbach of the Pittsburgh College of Pharmacy and will appear in the final report.

THE EXAMINATION OF CHARRED DOCUMENTS.

BY C. AINSWORTH MITCHELL.

Various methods of deciphering charred documents have been studied, and an effective process of development by calcination has been devised. This also affords a means of distinguishing between certain kinds of printing-inks, typing-inks, and colored pigments, and even, in some cases, of determining the sequence of the strokes in writing. The relative value of thorium, cerium, and aluminium salts for strengthening charred fragments before calcination has been ascertained. Thiocyanic-acid vapor has been found a useful reagent for developing illegible writing in iron-gall-ink on charred paper; its sensitiveness as a test for iron has been determined. The photographic method of deciphering burned

documents has also been examined, and has been found to have only a very limited applicability. *Journal and Pharmacist.*

CONVICTIONS UNDER THE ANTI-NARCOTIC LAW.

Recent convictions under the anti-narcotic law are encouraging, at least one of the means for stopping the illegitimate sale of narcotics is to assess fines and to enforce them. Prison sentences are more effective than money fines. In Philadelphia recently, Judge John J. Monaghan sentenced two men found guilty of possessing and selling narcotics to serve five years and eleven months in prison. The Judge said that he proposed, by the imposition of severe sentences, to keep the city clear of narcotic traffic. Judge Henninger also passed sentence on another convicted of the same offence, of two years in prison and a fine of \$1000.

* With the proper facilities part of those marked with a * might have been made.