

DR. E. G. STEWART: I understand there are only occasional cases. I did not mean to make it so positive that there would never be any, because there might be. I have a case that developed in six months, but such cases are very rare.

JACOB DINER: I am glad to have heard Dr. Stewart bring out the point of the sympathy for dogs and the lack of sympathy for human beings. Some cities are mightily interested in seeing that the poor dogs do not suffer, so they catch them by the hundred and asphyxiate them; but they do not permit the laboratories to obtain an animal for experimental purposes. In New York they have great difficulty in getting dogs for experimental purposes, and daily hundreds of dogs are asphyxiated by the Society for the Prevention of Cruelty to Animals.

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VACCINE THERAPY IN THE LIGHT OF FACTS.*

BY ALEXANDER M. ROVIN.

Skepticism gives no impetus to the progress of science. On the contrary, it has long been recognized as an element of retrogression.

The human race has fought disease always in a spirit of optimism. This made possible what has been accomplished in conquering epidemics. Brilliant, practical and scientific discoveries in Bacteriology and Pathology have given us aid long looked for to clear up many disputed opinions concerning the control and treatment of infectious diseases.

Since the dawn of man, the human race in its struggle has endeavored to overcome many forces in nature and become master of the earth.

Intelligence is the great force in developing and cultivating man's faculties, in his adaptation of nature's forces, in overcoming diseases. Notwithstanding the many misdirected efforts of our civilization, we have made sufficient strides in general knowledge to make bacteriology, the basic science of preventative medicine, possible. By applying the discoveries made in bacteriology, the burden of disease is lightened, sickness becomes less frequent and less prolonged, a greater degree of health is secured, the efficiency of the individual and the nation is increased and life is lengthened and made more enjoyable. The eradication of bacterial infections looks more hopeful than ever, since standard bacterial suspensions have been successfully applied in the prevention and treatment of bacterial diseases. Bacterial vaccines offer the necessary stimulus in raising body resistance, preparing—so to speak—body cells (immunizing mechanism) for the adequate production of antibodies that make germ life and its destructive invasion impossible.

Antibodies are regarded as cell secreted destructive ferments and there are at least several varieties of them, *i. e.*,

- (a) Bacteriocidins, which kill bacteria.
- (b) Bacteriolysins, which dissolve bacteria.
- (c) Agglutinins, which clump bacteria and render them inactive.
- (d) Opsonins, which prepare bacteria for ingestion and digestion

by leucocytes, or so to speak, prepare them for injection by fighting cells that ingest bacteria. If the leucocytes are successful in ingesting all the bacteria, they are victorious and their victory means the overcoming of the infection. If, on the contrary, the leucocytes retreat

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or succumb in the struggle, they are destroyed by the poisons excreted or secreted by the bacteria, then the bacteria are victors in the perpetuation of the infection.

Antitoxins, which neutralize the poisonous substances produced by bacteria.

Wright demonstrated that the function of the antibodies called opsonins is to prepare bacteria for ingestion and digestion by the leucocytes. The name opsonin is from the Greek word *opsono* meaning, I prepare food for.

According to the opsonic theory of immunity, there are normally in the blood opsonins for a large variety of disease-producing bacteria. When a germ invasion takes place, tissue cells, if they are not crippled by the virulence of the organism, will immediately produce a large amount of antibodies including opsonins. In the meantime the leucocytes or phagocytic corpuscles of the blood rush to the site of invasion to repel the bacteria thus ingesting and digesting them, or in other words eating them up. This the phagocytes cannot do until the bacteria have been prepared by the opsonins.

Thus, we see that immunity to disease germs is produced in the healthy animal body by the action of the disease germs themselves which have the power of stimulating tissue cells to produce antibodies. Some of these antibodies destroy the bacteria or render them inactive and others aid the phagocytes to ingest them.

The reason such cell activities in antibody production do not always follow germ invasions, is due to the activities of the germ in the involved tissues. If the germs are very virulent, are capable of secreting active ferments which adequately digest the food on which they live, these activities of the germs have such a harmful influence on the vitality of the tissue cells that antibody formation is delayed or inhibited, thus allowing the germs to continue their ravages without hindrance, resulting in tissue destruction, pus formation or death. Antibody formation under such conditions is evidently developed at the periphery of the infected area; in tissues that are influenced by the infection but not too intensely involved. Here is where bacterial vaccines come to the rescue. By injecting organisms into healthy tissues, similar tissue cell activities for antibody production are aroused as when a germ of comparatively low virulence gains possession of the body. These antibodies then opsonize, agglutinate or otherwise influence the living organisms in the infected area and cause their destruction.

It is now well understood that many of the early failures in antibody production from the use of vaccines were due to the use of vaccines composed of but one variety of a certain species of germs, the vaccines not being polyvalent. From prophylactic and therapeutic experience we find that the immunizing power from a bacterial vaccine, composed of selected vigorous organisms of as many varieties of a given bacterial species as possible, possess higher immuno-producing properties (antigens) than single organism vaccines. Notwithstanding this clinico-scientific fact, standardized polyvalent stock vaccines have been most seriously attacked on the ground that they do not contain the precise strains which are actually present in the infection itself. It has been urged that a bacterial examination must be first made, and that then an autogenous vaccine be employed.

These objections sound plausible enough on the surface, but do not stand the test of critical analysis. The clinical results obtained by physicians show that a vaccine need not necessarily contain absolutely the same strain of streptococcus

that is present in the infection. There are real immunizing effects from different types of streptococci toward each other. Experience in the active clinical field, tends to show that even pneumococci will immunize against streptococci and vice versa. This can readily be accounted for on the ground that the pneumococcus and streptococcus are closely allied organisms and may be converted under special conditions from one to the other. The element of time in acute general infections is a far more important factor in the use of vaccines than complete identity of vaccine with infective organisms. If the clinical signs indicate the presence of a streptococcus infection, the results will be far better when a polyvalent stock streptococcus vaccine is promptly injected than when the slow, cumbersome process of taking a culture and making an autogenous vaccine is resorted to. Meanwhile, a culture for the purpose of making an autogenous one may be procured, but it will generally be found that the infection is under control by the time the autogenous vaccine is ready for administration.

It is hard, however, to understand how a great many well-meaning members of the profession do sometimes withhold the acceptance of facts dictated by the teachings of clinical experience, and cling to the opinions of ultra-scientific deductions. Facts and not opinions are the elements that make enlightened knowledge possible in the progress of applied therapeutics. Medical science is regarded as classified knowledge and recognized as such it must be arranged or so worked out that it can be applied to the best service of human society. The progress of any therapeutic agent as a remedial utility is not measured by theoretical conceptions but by its results in practical application. The contention for the advantages of any therapeutic remedy, whether presented by a professor of therapeutics in a medical college or by a humble practitioner, must be equally amenable to proof, and, dealing with vaccine therapy, it must be remembered that nearly a decade has elapsed since the use of bacterial vaccines in the treatment of infectious diseases was first begun; and it may be fairly said that any method of treatment which has passed through so long, so rigid and so thorough a probationary period must be ready for appraisal. The storm of extravagant enthusiasm with which a new remedy is apt to be greeted, has certainly passed after twelve years; there has been sufficient time to ascertain whether theoretical presumptions are borne out by practical experience; and, indeed, there must exist a great mass of actual proofs, tangible and verifiable data, clear and conclusive findings, necessary for a final judgment.

It may be said that in modern medicine no absolutely worthless remedy has had more than a brief existence in the medical armamentarium. When, therefore, a therapeutic procedure is more widely employed day by day, month by month, year by year, when it never loses but gains in appreciation, there is at least a strong presumption in favor of it. All this applies to the standardized polyvalent stock vaccines. They have obtained such support as the law of the survival of the fittest is capable of supplying.

As to the objection that standardized polyvalent stock vaccines contain species of bacteria which are not actually present in the infection, it loses its point also. Standardized polyvalent vaccines are harmless; no injurious result has ever been reported even from doses which far exceed those commonly given. Why not, therefore, give a combined polyvalent stock vaccine which will act prophylactically as well as therapeutically? Diphtheria antitoxin is given on the suspicion that

diphtheria bacillia may be present in the throat; why not, a vaccine containing the other organisms which are likely to make a habitant there? Why not a gonococcus vaccine which contains, in addition to the specific germ, those organisms which are common secondary invaders of the urethra? It is not fair to call this "shot-gun" treatment. The word "shot-gun" was coined for prescriptions which contain therapeutic incompatibilities; the standardized polyvalent vaccines, however, answer the purpose of a synergetic remedy, each constituent playing a definite therapeutic or prophylactic role.

Furthermore, careful study shows that most diseased conditions are due to a comparatively small group of organisms and most of these organisms gain entrance into the body through the mucous membranes. In the respiratory tract the most important invaders are the pneumococcus, streptococcus, staphylococcus, the micrococcus catarrhalis and Friedlander bacillus. In the digestive and urinary tract we find the colon bacillus, streptococcus, pneumococcus, gonococcus and staphylococcus. To vaccines which meet the bacteria usually found in the infections of the respiratory tract or those in the digestive or urinary tracts, the criticism of being unscientific can certainly not be fairly applied. Even in the specific infections such as whooping cough, measles, scarlet fever, influenza, gonorrhoea, etc., these ordinary pus organisms play an important role in the disease process, and for this reason the patients should receive mixed vaccines.

Theoretical preconceptions can not ultimately prevail against the facts of experience. Clinicians and physicians throughout the world are recognizing the importance of standardized polyvalent stock bacterins in medicine, and no amount of opposition can stem the tide. "Surround truth by bitter denial and contradiction," said Carlyle, "and you furnish it with the soil for its permanent growth." No better demonstration of this fact can be found than the gratifying growth of vaccine therapy—even now the subject of intense animosity.

A perusal of medical history, however, shows that every school of practical thought that brings forward new ideas must suffer animosity, suspicion and ridicule.

Polyvalent vaccine therapy, as an applied science, is evolved from all preceding stages of accomplishment and failure, and the research of many unselfish investigators who believed that it is in the actual doing and observing of things that we learn how to make profitable, logical and practical conclusions in conserving, preventing and treating the human race from the ravages of bacterial diseases.

In the words of the great Emil Von Behring "I have no fear that the thought which forms the basis of applied immunity in the prevention and treatment of infectious diseases, will ever disappear out of the practice of medicine." In fact standardized polyvalent bacterial vaccines stand as the keystone of preventative medicine, which is the triumphal arch of modern civilization.

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