

With this device, we have established an efficient method of Arnold sterilization which combines cheapness, cleanliness, expediency and safety. It is economical because there are no burned out Arnold sterilizers to be repaired, the live steam from a central supply source is cheaper than gas, and there are no gas plates to burn out and be repaired. It is clean because there are no burners to backfire and thus no soot to be spread about. It is expedient because the required temperature is obtained within one minute instead of requiring fifteen or twenty minutes as with the gas heating method. Last, but not necessarily least, there is no danger from fire or overheating in case the Arnold becomes dry, as it is liable to do when in charge of a careless student.

For these reasons, we feel that we have a more efficient device than the old type of gas heated Arnold.

THE VALUE OF BACTERIAL VACCINES IN IMMUNIZATION AND THERAPY

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During such an epidemic as is now in progress, many physicians become panicky and jump at anything that seems to give promise of preventive and curative possibilities. As a result, commercial houses and laboratories are reaping a financial harvest through the sale of products which could do no good and may do harm. Thus vaccines are being used by many physicians without a proper understanding of the action of such forms of treatment.

In THE JOURNAL last week was an editorial on "Influenza" which calls attention to the prevailing impression regarding specific preventive and therapeutic measures in this disease. It says: "It is doubtful whether such measures exist and also whether they will be discovered in time to demonstrate their virtues in connection with the present conditions. This is especially true when we consider that the bacteriology of these infections varies in different parts of the country and that different persons react in different ways to different bacteria." These statements, I believe, should be discussed more fully, as they have an important bearing on vaccine therapy and preventive measures in other diseases of known and questionable bacterial etiology.

Bacterial vaccines consist of suspensions of killed bacteria in salt solution, oil (lipovaccines) or water, usually with a small amount of preservative, phenol or tricresol, added. There are two kinds: "stock" and "autogenous."

Stock vaccines are those made from laboratory strains of bacteria isolated from patients some time previously. Many of these strains have been grown on artificial mediums for several years.

Autogenous vaccines contain the organisms isolated from the disease process present in the patient for whom the vaccine is made.

GENERAL POINTS ABOUT VACCINES

1. A vaccine is never an emergency form of treatment: it is not indicated in acute, generalized infections.

2. Autogenous are undoubtedly better than stock vaccines for therapeutic purposes:

(a) They contain a growth of the strain of organisms causing or at least associated with the trouble.

(b) They are freshly prepared.

(c) Their antigenic properties are greater.

(d) Their toxic properties are less.

(e) Organisms isolated and made into a vaccine as soon as possible after being removed from the human body usually have greater immunizing properties.

3. As a rule, vaccines prepared four months or more prior to the time when needed should not be used:

(a) Their antigenic or immunizing properties are low.

(b) Their toxic properties are high (a and b can best be demonstrated in *B. coli* and *B. typhosus* vaccines).

(c) They may split up even to the point at which they are devoid of either antigenic or toxic properties and are practically inert.

4. There is a question as to their specificity. Many authorities and clinicians believe that bacterial vaccines are specific

in their action, that is, they cure the disease in question by the production of specific immune bodies. There are also those who go to the other extreme and believe that vaccines are absolutely valueless as therapeutic agents. Some of the former use vaccines for every disease caused by bacteria. It is probable that neither of these groups is wholly correct, since there is sufficient proof that certain diseases of bacterial origin are markedly improved following the injection of some protein material foreign to the particular specific bacteria in question. On the other hand, there is ample evidence that specific bacterial antigens in a limited number of sub-acute and chronic infections are valuable and do yield excellent results.

5. Vaccines when indicated should not be used to the exclusion of other forms of medical, surgical or general management. It is a mistaken idea that a vaccine used alone is a cure. A vaccine should be considered as an adjuvant and used always in addition to other forms of therapy and management indicated in the case in question.

6. According to my experience, vaccines are of value in the treatment of: (a) furunculosis and localized abscesses; (b) acne vulgaris; (c) colon bacillus pyelitis and cystitis; (d) chronic gonorrhoea and gonorrhoeal rheumatism; (e) chronic bronchitis, and (f) bronchial asthma of bacterial origin.

7. Vaccines have very little value if any in: (a) infections of bone and rigid walled cavities; (b) intestinal tract infection, or (c) infections of the uterus and adnexa.

8. They are contraindicated in (a) acute infections and infectious diseases; (b) septicemia and pyemia during acute stages; (c) malignant endocarditis, etc.

PERTINENT QUESTIONS ON VACCINES

It is necessary, then, to ask oneself several pertinent questions:

1. *By what method or through what channels does a given vaccine produce results?* It is supposed, and to some extent known, that foreign protein substances or cells introduced into the body of an animal will be destroyed by something within the fluids, tissues or leukocytes of that animal. Undoubtedly this substance is of the nature of a ferment. It is known that repeated injections of certain of these bodies, as certain types of bacteria, will raise the power of the animal's resistance to this particular type or cell so that large numbers may be introduced without harmful results. Furthermore, these substances seem to be specific for this particular organism. Such an animal is then considered to be immune to this type of infection.

2. *Does immunization against one organism increase the resistance to other types of infection?* There is evidence in the literature of such an occurrence, more particularly in respect to closely related organisms, as in the colon-typhoid group. This, however, varies so greatly in different persons that a positive statement cannot be made.

3. *Can all persons be so immunized?* They cannot, and this is one reason for the development of bacterial disease at a time when, according to our present knowledge, resistance should be greatest.

4. *Are all strains and types of bacteria suitable for immunizing purposes?* They are not, because many bacteria are incapable of producing any reaction on the part of the host to produce specific bodies capable of destroying these organisms. The Pfeiffer bacillus (according to Victor C. Vaughan) is one example of such an organism.

5. *How long does it take immunity or increased resistance to certain organisms to develop?* It takes from eight to ten days to several weeks and sometimes longer.

6. *How long does a given increased resistance last?* This is known to vary within very wide limits from a few weeks to years. In the streptococcus and pneumococcus group, certainly, increased resistance is of very short duration and of a low degree.

TREATMENT WITH VACCINES

In the treatment of conditions in which vaccines are indicated, a good rule to follow is to begin with a dose small enough to avoid a generalized reaction, and gradually increase

this dose to the point at which perhaps only a slight local reaction occurs. At first one may give the injections every day to determine what is the proper dose for the patient being treated. When this point is determined, one should continue to give increasing doses at three or four day intervals until one is giving at each injection not more than one billion organisms. Massive doses of killed organisms are likely to be quite toxic and produce harmful rather than beneficial results. As a matter of fact, under such conditions it is possible to lower greatly the normal resistance of the person treated.

It must be remembered also that the body cells of persons with acute infections are quite sensitive to foreign protein injections. This is important, and physicians using vaccine therapy should bear it in mind and treat such patients with caution.

In prophylactic immunization, especially against typhoid, persons with chronic malaria, tuberculosis, bronchitis, nephritis, etc., are quite likely to react so severely to the ordinary injection that harmful results not infrequently follow.

SUMMARY

Vaccines undoubtedly are of value in increasing resistance against the development of certain diseases. They have curative properties in some chronic conditions, which have been enumerated. Before applying this method, the physician should be sure that the organism used is the actual cause of the condition in question. Immunity against the majority of bacterial diseases at best develops rather slowly, is rarely great, and is usually of short duration. Vaccine therapy is never an emergency form of treatment and therefore should not be used during an epidemic.

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THE DIAGNOSIS OF PRIMARY SYPHILIS BY CULTURE

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The physician engaged in extensive venereal practice is at times confronted by patients presenting a lesion of the foreskin or penis which, on account of previous medication, such as the use of calomel ointment, calomel dusting powder, burning with acids or escharotics, or the use of antiseptics, no longer presents the typical appearance of a chancre.

An attempt to make a diagnosis by means of the dark field usually fails, as the employment of the agents indicated above eliminates *Spirochaeta pallida* from the superficial tissues of the chancre, so that even the application of a suction cup does not yield serum which discloses the spirochete on dark-field examination.

In the course of study on the cultivation of *Spirochaeta pallida*, it was found that this organism can be grown from human tissue directly, when small pieces of such tissue are planted on horse serum medium. This medium consists of normal horse serum, free from preservatives, diluted with sterile distilled water in the proportion of 3:1. The diluted serum is put into ordinary test tubes, which are closed with rubber stoppers, previously sterilized. The tubes are filled to within an inch of the top, stoppered, and heated to 60 C. for one hour in a water-bath. The following day the temperature is brought to 70 C. for one hour, and the next day the medium is heated at 70 C. until it takes on the consistency of syrup. The tubes are then stored in the refrigerator. The heating on the three successive days not only gives the medium a semi-solid consistency, but also drives the air from the medium, so that it is under a partial vacuum.

Whenever the location of the suspected sore permits, the tissue is removed by circumcision; otherwise a thin slice of tissue is removed with a razor from the edge of the lesion. The tissue is then planted, and is pushed into the medium from one half to two thirds of the length of the tube.

The tube; if taken from the refrigerator, should be warmed to body temperature before the implantation is made.

If the lips of the tube are thoroughly heated so that the surface of the medium begins to boil, the air above the

medium is sufficiently rarefied to permit replacing the rubber stopper without difficulty after inoculation.

The inoculated tubes are incubated at 37 C. from three to five days, when a few drops of the medium near the tissue are removed with a pipet to a slide for dark-field examination.

Owing to the action of other organisms introduced with the tissue, the serum above the tissue may become liquefied, and the stopper blown out because of gas production by some of the bacteria. Nevertheless the spirochetes will be found in large numbers in symbiosis with these organisms, and can be detected under the dark field by their characteristic motility.

Tissues from such doubtful cases have been planted as late as twenty-four hours after removal. These tissues had been kept, wrapped in gauze, in the ice box for that length of time, and yielded positive cultures, when repeated dark-field examination of the scrapings of the fresh tissue itself were negative.

While the occasion for the procedure outlined may be rare, it will be found worthy of trial, especially since *Spirochaeta pallida* seems to remain in a viable state in the tissues for at least twenty-four hours after removal. The observation of patients, with late developments of syphilis, who never had specific treatment because the initial lesion was removed by circumcision without being recognized as specific, led us to the procedure outlined above.

Such tissues, placed in a small quantity of bouillon and the tube sealed, could no doubt be forwarded to laboratories equipped to do the necessary bacteriologic work.

Therapeutics

A DEPARTMENT DEVOTED TO THE IMPROVEMENT OF THERAPY.
A FORUM FOR THE DISCUSSION OF THE USE OF DRUGS
AND OTHER REMEDIES IN THE TREATMENT OF DISEASE.

USE AND ABUSE OF CATHARTICS *

(Continued from page 325)

PURGATIVE PILLS

ALOES

When prescribing a purgative pill, all that is really necessary is to order a sufficient dose of aloes. On account of its reliability, the fact that it does not lose its efficiency on prolonged use, and the relative smallness of its dose, aloes is the practically universal ingredient of cathartic pills. It is, therefore, worth while to study the peculiarities of this drug somewhat more closely.

As the odor is repulsive and the taste intensely bitter, aloes is unsuitable for administration other than in pill form. Its liquid preparations are therefore of no practical importance. Because of their nauseous odor, even its pills are disagreeable unless coated. When extemporaneous pills are prescribed, the mass should always be put into gelatine capsules.

Mode of Action.—It is a curious fact that the glucosids of which aloes is composed are inactive until they become decomposed into sugar and anthraquinone bodies, such as emodin, on which the activity of aloes depends. It is evidently because of the necessity for this change, which occurs in the intestine, that aloes is so slowly acting a purge. From eight to twenty-four hours may elapse before the effect occurs. Hence, it is generally administered at bedtime; though, as the active ingredient of so-called "dinner-pills," it is sometimes given with meals, whether before or after probably does not matter.

* This is the seventeenth of a series of articles on the pharmacology, physiology and practical application of the common laxatives and cathartics. The first article appeared October 18.