several days; and a third similar starvation period, after another fortnight, again resulted in the complete disappearance of sugar, with only a very moderate recurrence a week later. This patient has experienced a decided improvement in her nutrition, and has put on 5 lb. in weight.

During the time of abstinence from food in all these cases the patients were allowed a breakfastcupful of tea morning and evening, and a large tumblerful of aerated water once or twice during the day. Every night at bedtime a pill containing 1 grain of calomel and 3 grains of extract of colocynth was administered with—the following morning—a dose of magnesium sulphate sufficient to produce one or two copious watery alvine evacuations.

Too much must not, of course, be attributed to this plan of treatment, but it may be at least claimed that three important results are established—first, that an immediate, even if temporary, diminution in the sugar output is achieved; secondly, that the sugar, when it reasserts itself, recurs in diminished amount; and thirdly, that the patient, far from experiencing any serious inconvenience from the complete withdrawal of food, rapidly loses all sense of hunger or thirst, and invariably finds a subsequent improvement in general health and in the sense of well-being. It has been suggested that such drastic measures may be fraught with the danger of increasing the risk of acidosis, but in the cases I have watched no such undesirable development has occurred.

Is the result due to a temporary disintoxication of the tissues whereby the normal equilibrium is afforded some chance of restoration? It is not an impossible explanation, and one which may be more readily accepted if it be conceded, as some observers have stated, that the pancreas is responsible not only for the completion of the digestive processes, but also, to some extent, for the scavenging work of the body.

The latest newcomer on the field of experimental therapeutics is radium, whose emanations are said to be able to cure a multitude of disorders, and among them diabetes. In regard to it, as to many others that have been equally loudly extolled, it will be wise to "wait and see."

In the choice of drugs, we are still driven to depend upon opium or its derivatives as our sheet anchor. In my own experience I find codeine the most valuable of all the opiate series, and in a large majority of cases the following combination affords me considerable help: Extract of valerian and pure carbolic acid, of each 2 grains; codeine, $\frac{1}{2}$ to 1 grain; and extract or cascara, $1\frac{1}{2}$ grains. The valerian steadies the nervous system, the carbolic acid disinfects the intestinal canal, the codeine controls the output of sugar, and the cascara provides for the daily evacuation of the bowel.

Salkowski and others have strongly advocated the administration of arsenic, but its only effect would seem to be a secondary result from its tonic influence on the nervous system. On the pancreatic theory of causation it is logical to endeavour to furnish the body artificially with the hormone provided under normal conditions by the islands of Langerhans. There are many preparations of pancreas on the market; but one of the best is issued by Fairchild Brothers, under the name of "Holadin." It is said to contain all the constituents of the gland, both digestive and internal secretory, and is put up in gelatine capsules, each containing 3 grains. I have used it repeatedly, and in some cases it has apparently been of value.

An annual sojourn at Vichy or Carlsbad and an equable, sunny, dry climate is of service to many patients, but so far as health resorts and climate are concerned, individual idiosyncrasy must be carefully considered as well as the indications otherwise which the general health of the individual suggests. One important point in the management of glycosurics, which is of universal application, should never be lost sight of, and that is the prejudicial effect upon all of them of excessive and prolonged strain, whether of mind or body. The more equable and uneventful the daily routine of life can be made, consistently with freedom from ennui and boredom, the more likely is the imperfect metabolism to succeed in maintaining the bodily processes in a condition consistent with a fair measure of good health. In those cases where, as a terminal event, coma threatens to supervene, we must depend upon salines in generous amount, given either by the mouth, or by the rectum, or intravenously, as the one and only slender chance on which we have to depend for saving the situation.

D

THE ACTION OF SALICYLIC ACID AND CHEMICALLY ALLIED BODIES IN RHEUMATIC FEVER.

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THE following account of the action and relative value of salicylic acid and chemically allied substances in the treatment of rheumatic fever has been drawn up as part of a scheme of work undertaken by members of the Therapeutical Subcommittee of the Association. It is based on results obtained by clinical observation supplemented by laboratory experiments. A number of the substances examined have proved to be inert, but I have included these results as they may have some value for future researches in the same field. Of late years numerous synthetic bodies have been introduced into practice as substitutes for the salicylates, but even a superficial survey of these so-called "new drugs" showed that the great majority of them are merely compounds which originally contain salicylic acid, or which form it in the body, and that they represent no new therapeutical idea or discovery. Their value, in short, can be estimated in most cases by the simple process of calculating their content of salicylic acid. Others of the remedies designated "antirheumatic" are merely analgesics and have no specific curative action. These considerations enabled me to limit very considerably the number of substances to be tested. The report as here presented is partly a critical estimate of the value of certain more or less well-known remedies in acute rheumatic infections, partly an examination of substances which seemed possible improvements on these, and partly a contribution to the relationship between chemical constitution and therapeutical action in these infections.

Unfortunately the bacteriology of acute rheumatism is still an undecided question. Using cultures of the *Micrococcus rheumaticus* (of Poynton and Paine, and Beattie), I have never been able to produce in animals any of the symptoms or lesions of rheumatic fever, and I have also been unable, by using a vaccine of the killed organisms, to obtain any curative effects or any constant reaction in patients suffering from rheumatism. The vaccines were mostly made from cultures obtained from Drs. Paine and Beattie, but some were bought from Messrs. Burroughs and Wellcome, and the doses given varied from half a million to 250 million organisms.

According to present views, the absence of any reaction to large doses of the dead bacteria tells against the specific pathogenic nature of the organism. Further, it is an organism difficult to grow satisfactorily and easily killed. For these reasons I used the yeast plant, a streptococcus, *Bacillus coli*, a hay infusion, or a fungus growth on gelatine, when I wished to test the relative antifermentative and germicidal strengths of any of the substances I was investigating. Their relative toxicity was determined when necessary on rabbits. The observations have extended over many years, but I have compressed the results obtained into as small a compass as possible, and, to avoid entering into details or side-issues, have given references to papers where these are discussed more or less fully.

PHENOL (C_6H_5OH).

The simplest of the aromatic compounds is benzol (C_6H_6), and, what may be regarded as one of its simplest derivatives, phenol, is wholly without any action in acute rheumatism, at least in such doses (2 grains every four hours) as can be conveniently given. Its action in stopping the fermentation of a solution of sugar by yeast is not a powerful one. I found that 1 in 200 completely prevented fermentation, while 1 in 300 delayed it, and weaker strengths had little effect.

BENZOIC ACID (C_6H_5COOH).

The introduction of the carboxyl group into the benzol ring brings about an important change, and confers a specific remedial action in acute rheumatism. When benzoic acid or sodium benzoate is given in doses of

15 to 20 grains hourly or two-hourly, the action is unmistakable, but is very much weaker than that of sodium salicylate. Pain is diminished in two or three days, but it takes from four to seven days until the temperature and pulse-rate are satisfactorily reduced. No sweating nor any poisonous or depressing effects are noticed beyond sometimes slight buzzing in the ears. Yeast fermentation was prevented by benzoic acid in a strength of 1 in 500; 1 in 1,000 checked it, but fermentation still went on slowly for several days, and 1 in 2,000 had a slightly retarding effect only.

OXYBENZOIC ACIDS.

Salicylic Acid ($C_6H_4.CO_2H.OH$).

There are three hydroxy-benzoic acids formed by introducing OH into benzoic acid. Salicylic acid is the ortho-acid, while the others are known as meta- and para-oxybenzoic acids. They differ in the relative position of the CO_2H and OH groups in the benzol ring, thus—

and this slight difference in constitution exercises a profound effect on their pharmacological actions. In comparison with benzoic acid, salicylic acid is a much stronger antifermentative and antirheumatic, while the meta- and para-oxybenzoic acids have a very feeble action of any kind, and have lost the specific action possessed both by benzoic and salicylic acids in acute rheumatism.

Para-oxybenzoic Acid was given in 15-grain doses two-hourly, along with an equal amount of sodium bicarbonate, until about an ounce or more had been taken, and *Meta-oxybenzoic Acid* in the same way and dose. There was either no action or a very indefinite improvement, so slight as to make it doubtful whether the drug had had any influence. These two acids have a very feeble effect in preventing yeast fermentation. With both, 1 in 100 prevented it entirely, 1 in 200 delayed it, and weaker solutions had no action, while in the case of salicylic acid 1 in 2,000 inhibited fermentation entirely, and strengths up to 1 in 5,000 delayed it greatly. The relative action on a culture of *Bacillus coli* in bouillon was also marked. When the culture was kept in contact with a solution of 1 in 1,000 salicylic acid in water for three-quarters of an hour no further growth took place in plate cultures; with meta- and para-oxybenzoic acids a solution of 1 in 500 kept in contact for two hours was required.

The toxicity of the three acids to rabbits shows marked differences also. They were given by the mouth neutralized with sodium carbonate, and while in medium-sized rabbits 60 to 90 grains of salicylic acid usually proved fatal, with para-oxybenzoic acid 180 grains was required, and with meta-oxybenzoic acid up to 135 grains was given without any marked action.

Salicylic Acid in 15 and 20 grain doses every four hours has no superiority to sodium salicylate in effectively treating cases of acute rheumatism. It was given as a mixture suspended with mucilage, and did not cause any particular gastric irritation. Salicylic acid was the preparation originally used clinically, but was soon replaced by sodium salicylate, as the latter is more soluble, and also less irritating to the stomach.

SODIUM SALICYLATE.

Sodium salicylate ($C_6H_4.COONa.OH$) in sufficient doses (90 to 160 grains or more in twenty-four hours) acts very satisfactorily when the infection is recent, when the inflammation is confined to the joints, and when treatment is begun early.¹ It is quite otherwise when the fibrous tissues of the heart valves or of the muscles or body generally are deeply implicated. Then it does not act so rapidly or effectively. Such cases linger on for weeks or months in spite of treatment, and relapses are very apt to occur.² For this reason, and especially to avoid the occurrence of permanent damage to the heart, it is a matter of first-rate importance to discover a more active antirheumatic than the salicy-

lates. In an uncomplicated case of acute rheumatism about 1 oz. of sodium salicylate spread over two to four days is usually sufficient to abolish symptoms, but this does not kill off the infective organisms, and hence relapses are apt to occur unless its administration is kept up in suitable doses for about three weeks or longer, when in most cases the infection has been overcome.

Mendl has advocated the intravenous administration of sodium salicylate,³ and as given thus it very rapidly lessens pain, but it is not an effective method owing to the dose (5 grains) being too small, and to the practical impossibility of giving it often enough to keep the blood sufficiently saturated.

Very large doses⁴ have also been advocated, with the idea of sterilizing the body—up to 400 and even 500 and 600 grains in twenty-four hours; but, apart from the risk of causing acidosis, it is doubtful if the body can be sterilized in this way, and it is not agreed that they are practically more efficient than smaller ones.

Sodium salicylate is a feeble germicide and antifermentative. It has almost no action on yeast or bacteria.

SALIGENIN.

Saligenin ($C_6H_4.CH_2OH.OH$) (o-hydroxybenzylalcohol) is chemically the alcohol of which salicylic acid is the corresponding acid, and in the body it is readily converted into the latter ($C_7H_6O_2 + 2O = C_7H_4O_3 + H_2O$), 100 parts yielding 111 parts salicylic acid. It is a white powder without much taste, is readily soluble in warm water and in alkalis, and does not irritate the stomach if pure. I treated four cases with it, giving 10 grains every two hours. Its action was very rapid and satisfactory. In one case the pain ceased in twelve hours and the temperature was normal in thirty-six hours; in another the pain and swelling of the joints had gone in thirty-six hours; in a third after twenty-two hours; in the fourth the fibrous tissue was widely affected, and 1,340 grains were required. It causes a good deal of perspiration, and two of the cases suffered from deafness. Outside the body it has no antifermentative or antiseptic action. In rabbits when given per os its action was rather irregular, but 45 grains was usually a fatal dose.

SALICIN.

Salicin ($C_6H_4.OCH_2OH.C_6H_{11}O_5$) is the glucoside of saligenin, and is hydrolyzed in the body into its two components, the saligenin being oxidized to salicylic acid. Scheffer⁵ states that this takes place in the blood. It yields only 43 per cent. of its weight of salicylic acid, and therefore needs to be given in a dose twice as large as sodium salicylate (of which 13.3 per cent. is Na). It is quite soluble in warm water, has a bitter taste, and if well diluted does not irritate the stomach. It is excreted in human urine as salicylic and salicyluric acids, never as unchanged salicin. Given in 20-grain doses hourly, or 30 grains every two or three hours, its action in rheumatic fever is highly satisfactory. I have often given 60 grains, and repeated it in two hours without any ill effects. Its action in acute rheumatism depends on the development of salicylic acid in the blood, but both it and saligenin differ somewhat from salicylic acid or sodium salicylate in their general action. A solution of 1 in 250 does not prevent yeast fermentation, and it seems to have in itself little or no effect on low organisms.

ACETYL-SALICYLIC ACID.

Acetyl-salicylic acid ($C_6H_4.CO_2H.OC_2H_5O$) is scarcely soluble in water, and the solution gives no purple colour on adding ferric chloride (no free salicylic acid). In the presence of alkalis the acetyl group splits off and leaves salicylic acid, a change which takes place in the duodenum, where at the same time sodium and other salicylates are formed. It is doubtful, however, whether the whole of it undergoes these changes, as it is a much more powerful analgesic than sodium salicylate, and this can only be accounted for by assuming that a part of it is absorbed unchanged and exercises this effect. A comparatively slight analgesic action such as acetyl-salicylic acid exerts cannot be satisfactorily studied in animals, but patients agree that even in non-rheumatic affections it lessens pain. This is true only to a very slight extent of salicin or salicylic acid.

In acute rheumatism doses of 15 grains three or four hourly act very satisfactorily. There is no reason to suppose that the action is other than that of sodium salicylate. I have found that it irritates the stomach in many people more than sodium salicylate does, and that it is equally liable to cause perspiration, deafness, and ringing in the ears. Serious drawbacks to its clinical use are that it is incompatible with sodium bicarbonate, that it cannot be pushed to large doses without causing sickness, and that it is insoluble in water and cannot be given as a mixture.

A solution of 1 in 250 does not stop yeast fermentation, so that any antifermentative or antibacterial action must only occur when its salicylic acid is split off and can act by itself.

SALOL.

Salol (phenyl-salicylate) ($C_6H_4.COOC_6H_5.OH$) is split up in the small intestine into salicylic acid and phenol. The dose is limited by the poisonous action of phenol, and it is therefore quite impossible to give as much of it as will yield enough salicylic acid to treat efficiently a case of rheumatic fever.

QUININE SALICYLATE.

Roughly, one-third of this salt is salicylic acid and two-thirds quinine, and the dose is usually stated as 1 to 5 grains. The quinine part is inert in rheumatic fever, and the salicylic portion is quite insufficient in amount. Cases treated with 10 to 15 grains six-hourly showed practically no improvement. Deafness and ringing in the ears are brought on very readily by it.

METHYL SALICYLATE.

Methyl salicylate ($C_6H_4.COOC_6H_5.OH$) can be given internally, in 10 to 15 minim doses every three or four hours, in milk, or on sugar, or in emulsion, and it can be externally applied at the same time to the inflamed joints. Cases treated in this way improve very rapidly, and there can be no doubt about the efficiency of the method.⁶ It is, however, very apt to cause nausea and sickness.

Baas says that 8 to 13 per cent. of it is excreted in the urine unchanged, and the remainder as ethereal salicyl-sulphate.

GLYCOSAL.

Glycosal ($C_6H_4.COOC_3H_5(OH)_2.OH$) is a glycerin-ester of salicylic acid. Given in 90 to 120 grains per day its action was feeble and unsatisfactory, owing to the insufficient content of salicylic acid.

SALICYLURIC ACID.

Salicyluric acid ($C_6H_4.CO(NH_2CH_2.COOH).OH$) is the form in which salicylic acid is chiefly excreted in the urine, accompanied by a certain varying amount of salicylic acid always in very much smaller quantity. It is formed in the body by a combination with glycochol (amido-acetic acid, $NH_2CH_2.COOH$). It has lost almost entirely the poisonous and antifermentative and antibacterial actions of salicylic acid, and it is quite inert in acute rheumatism.⁷ The fact that salicylic acid is so rapidly and so largely converted into this inert substance in the body explains why it is necessary to give it in frequently repeated and large doses to maintain its effect.

DIMETHYL-SALICYLIC ACID.

Dimethyl-salicylic acid, methylsalicylate of methyl ($C_6H_4.COOC_6H_5.OCH_3$), is an oily volatile substance with a slight odour and an irritating aromatic taste. It gives no purple colour with ferric chloride. Four grains given per os to a rabbit had no action, but 8 grams was fatal after some hours. The urine gave no purple colour with ferric chloride. Doses of 20 minims four-hourly proved absolutely without action in rheumatic fever. It is not converted into salicylic acid in the body, and this accounts for its non-effect. A solution of 1 in 1,000 did not prevent yeast fermentation.

TOLUIC ACID, SALICYLOUS ACID, ETC.

Sodium Methylsalicylate ($C_6H_4.COOC_6H_5.ONa$), and Salicylous Acid (salicylic aldehyde) ($C_6H_4.CO.H.OH$), the three Toluic Acids⁸ ($C_6H_4.COOC_6H_5.CH_3$) and Disodium Salicylic Acid ($C_6H_4.COONa.ONa$) are all too irritating to give internally.

METHOXYBENZOIC ACID.

Methoxybenzoic acid ($C_6H_4.COOC_6H_5$), methylsalicylic acid—

is the ortho-acid, and Anisic Acid is the para-acid—

The latter has almost no action of any kind. The former has no perceptible action in acute rheumatism in 15-grain doses four-hourly. The urine gives a very faint purple colour with ferric chloride, but practically it is not converted in the body into salicylic acid, and it has little or no action of its own.

Eight grams neutralized with sodium carbonate and given to a rabbit per os had no action on it. A strength of 1 in 500 prevented yeast fermentation in a solution of sugar, but lesser quantities had little or no effect.

POPULIN.

Populin ($C_{13}H_{17}(C_2H_5O)_7$) is benzoyl-salicin. It is in white crystals resembling salicin in appearance. Doses of 10 grains hourly and 20 grains three-hourly had no action. The urine sometimes gave a slight purple colour with ferric chloride and sometimes not. Four grams per os had no effect on a rabbit.

TETRA-BENZOYL-SALICIN.

Tetra-benzoyl-salicin was equally without action. I had hoped that the introduction of the benzoyl molecule into salicin would greatly increase its efficiency, but it did not do so.

CRESOTINIC ACIDS.

Cresotinic acid ($C_6H_3.COOC_6H_5.OH.CH_3$). Three of the cresotinic acids have the following formulae:

and all three, but especially the ortho- and meta-acids, have a powerful antirheumatic action. They have, however, no special advantages compared with salicylic acid, and as I have described their action in detail elsewhere⁹ I need not go into the matter again here. In all three the COOH and OH groups have the same relationship as in salicylic acid.

CINNAMIC ACID.

Cinnamic acid, $C_6H_5(CH=CH.COOH)$

is a combination of phenol with acrylic acid ($CH_2=CH.COOH$). Sodium cinnamate can be readily taken in 15 or 20 grain doses. In the body it is converted into benzoic acid, and although this exerts a mild but practically unimportant effect in acute rheumatism, in itself the cinnamate has no action. The acid is a fairly powerful antiseptic and antifermentative. A solution of 1 in 1,250 prevented yeast fermentation, 1 in 2,000 did not do so, and 60 grains given to a rabbit in emulsion per os had no apparent action.

COUMARIC ACID.

Coumaric acid ($C_6H_4.CH=CH.COOH.OH$) has the same chemical relationship to salicylic acid that cinnamic has to benzoic acid.

Only the ortho-acid was used, neutralized with sodium bicarbonate. It proved to be without effect. Six grams did not affect a rabbit, nor did a solution of 1 in 1,000 do more than slightly hinder yeast fermentation.

PHTHALIC ACID.

Phthalic acid, $C_6H_4(COOH)_2$. The ortho-acid given in 20-grain doses four-hourly, neutralized with sodium bicarbonate, has a very slight antirheumatic action. In 8-gram doses it is not fatal to rabbits, and it is very feebly germicidal or antifermentative. *Iso-phthalic Acid*, the meta-acid, seemed to be a quite inert substance in doses of 120 grains daily.

LOCAL APPLICATIONS.

The application of certain salicylic compounds to acutely inflamed joints and muscles greatly eases rheumatic pain, but the number of those which can be absorbed through the skin is very limited.

Methyl Salicylate is the most used and is the most efficient. It is seldom irritating to the skin, and can be rubbed in or applied as a dressing either undiluted or as three parts to one of olive oil. *Ethyl Salicylate* and *Methyl Meta-cresotinate* have the same effect, but their odour is equally pungent.

Mesotan ($C_6H_4(COOCH_2OCH_3)_2$), a methoxymethyl ester of salicylic acid, is efficient in lessening pain, but has the important drawback of being apt to cause troublesome eruptions.

Spirosal and *Ulmarene* are oily salicylic ethers without much odour, but also without much action.

A 10 per cent. ointment of *Salicylic Acid* made up with lard and a little oil of turpentine, is absorbed through the skin and has a marked local anodyne action, both when rubbed in and used as a dressing; but it is, on the whole, not suitable for ordinary use, as it damages the epidermis.

I have also used largely *Sodium Salicylate*, 2 or 3 grains in 10 minims of water, injected locally by means of a hypodermic syringe. This lessens or abolishes pain at the spot almost at once, but the effect is very transient and lasts only for about half an hour to an hour. The amount which can be given locally by ionic medication is also too small to be satisfactory in its effect.

None of these substances can be absorbed through the skin in such amount as to influence materially the general infection, and hence their value is merely in lessening local pain.

It is said that decoction of willow bark has been long and successfully used by the Hottentots in Orange River Colony for acute rheumatism,¹⁰ and that in the United States the wintergreen is similarly employed by country people, but as regards our present-day practice we may take it that salicin was first used in acute rheumatism by T. J. MacLagan¹¹ in 1874 and salicylic acid independently by Buss¹² in 1875. I think it is correct to say that the discovery of the specific antirheumatic action of both these substances was a matter of accident, and that in the thirty-nine years which have since elapsed no substantial improvement has been made on them and no new therapeutical path has been struck. So far as I am able to judge, the real efficiency of the numerous compounds which have been recommended by manufacturing chemists in rheumatic affections depends solely on the amount of salicylic acid which they contain or develop in the body. Little is known as to how chemical constitution influences the antirheumatic action of this group of substances. As I have previously pointed out, benzoic acid, formed by the introduction of COOH into benzol, shows this specific action, but when two molecules of COOH are introduced (phthalic acid) the antirheumatic effect is diminished almost to vanishing point.

When, however, OH is introduced into benzoic acid to form salicylic acid, the efficacy is enormously increased, and it looks as if this OH were the determining factor, yet the stereo-isomers of salicylic acid, *m*-oxybenzoic and *p*-oxybenzoic acids, have no action. When the OH of salicylic acid is altered into OCH₃, as in ortho-methoxybenzoic acid, all antirheumatic effect disappears.

That the COOH molecule also has a dominating influence is shown by the fact that in cinnamic and coumaric acids,

where it is disturbed, the specific antirheumatic action is completely lost.

Methyl salicylate develops salicylic acid in the body and retains the specific action, while dimethyl-salicylic acid, which does not do so, is inert, and the same holds true in the case of other salicylic compounds, such as salicin (which is active) and populin (which is inactive). The cresotinic acids are the only substances which are known to equal or even approach salicylic acid in efficacy. The prevention of heart lesions, valvular and myocardial, should be the great aim of our treatment, yet it is notorious that heart lesions occur very commonly even while large doses of salicylates are being administered. It is still an open question whether these lesions and rheumatic lesions generally are caused by colonies of microbes or by toxins, nor do we know definitely whether the salicylates act as antimicrobics or as antitoxins.¹³ The most immediate explanation of their action is that they kill or injure a causal microbe, but it has also been maintained that the almost instantaneous although transient effect of a small dose given intravenously points to an antitoxic action, and that when given per os the rapid abatement of symptoms apart from the real cure, as shown by the tendency to relapse, points in the same direction.

It is not seriously held at the present day that any of our germicidal remedies can be given in sufficient amount to kill bacteria in the human body. The most we can hope for is that their vital activity and capacity to produce toxins may be abated, and that thereby the natural defensive agencies of the body will be enabled to deal with them more readily and effectively so that the infection is got rid of. Most probably this is what occurs in rheumatic fever under salicylic treatment, and it explains the tendency to relapse if the remedy be prematurely stopped or not given in sufficiently large doses.

But the most important of the many unsolved problems in the pathology and treatment of rheumatic infections is undoubtedly the discovery of a remedy powerful enough to abolish or greatly lessen the chances of injury to the muscle and valves of the heart. If this were successfully accomplished the incidence of serious heart disease would diminish to something like one-third of its present amount.

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THE fifth of the Galton Laboratory lectures on national eugenics was delivered by Mr. W. Palin Elderton, Fellow of the Institute of Actuaries, at University College, London, on March 11th. Mr. Elderton, whose subject was the mortality of the phthisical under sanatorium and tuberculin treatments, said that it was difficult to obtain exact figures, owing to the confusion which existed concerning the stage the disease had reached when the patient began the treatment and the precise nature of so-called cures. It was true that in recent years the mortality amongst advanced cases under sanatorium treatment had decreased considerably, whilst the number of cures amongst incipient cases had greatly increased. This, however, might possibly be due to the fact that advanced and incurable cases were not received in sanatoriums so readily as formerly, whilst, on the other hand, a far larger number of incipient cases were admitted, increased knowledge and experience having rendered it possible to diagnose the presence of tuberculosis in its very earliest stages. At the present moment it was almost impossible to come to a decision as to the relative merits of sanatorium and tuberculin treatment. It was as yet too soon to say definitely which treatment was the more successful; but what was certain was that the mortality amongst consumptives both in and out of sanatoriums was still extremely high. The aim of the medical profession at the present moment was to reduce this heavy death-rate at all costs; and he was confident that the day would come when some means of effectually checking the progress of the disease would be discovered.