Those of us who have gone through the forms of treatment of burns from the time of the Carron oil and the various modifications of the applications of wax, appreciate very much the more simplified treatment by tannic acid. I am glad that the author has given considerable leeway in this tannic application to burned areas, because I believe that there are many ways of doing it, and that the manner should be individual. Again, the giving of an anesthetic in severely burned patients, and treating the wounds in a surgical manner by thoroughly scrubbing and cleansing, after that applying the tannic acid in the way best adapted to the case, is a great advance. Emphasis, however, should be placed upon the complete tanning of the burned areas.

EDMUND BUTLER, M. D. (490 Post Street, San Francisco).—The tannic acid treatment of burns is undoubtedly the greatest single practical advance made in the management of this most distressing condition. The mortality resulting from burns of infants has been greatly reduced. The comfort of all patients has been definitely increased. I fear that those who have been disappointed with their results, following the use of tannic acid, have depended too much on the reputation of tannic acid, and not upon daily detailed care dictated by sound aseptic surgical principles. As Doctor Weaver has stated, the best results are had when nurses and house officers have been carefully instructed as to details.

Doctor Weaver rightfully stressed the proper cleansing of the burned areas before instituting the tannic acid treatment, and particularly is this step necessary when ointments, or oily liquids have been the primary dressing.

The tanned necrotic tissue must be considered as a protective dressing. As long as the wound remains sterile, the tanned slough is an ideal dressing. Every effort must be made to keep the slough aseptic. The painting of the margins of the tanned slough with gentian violet solution, as described by the author, is most important. Some surgeons remove the tanned necrotic tissue at the end of two weeks, and graft immediately or as soon as granulations appear in third-degree burns, and this procedure seems to shorten the time in the hospitals. Others wait for necrotic tissue to separate and then graft the granulating ulcer.

Davidson, in 1926, definitely proved that it is far better to irrigate or wash with water parts exposed to acids, or to alkalis, rather than to neutralize. The process of neutralization liberates energy which causes a further destruction of tissue other than that caused by the acid or the alkali.

JOHN HOMER WOOLSEY, M. D. (Woodland Clinic, Woodland).—Burns are always of an emergency nature, and standardization of treatment tempered by experience and study is essential if one is to avoid delay and miscarriage of proper care. Advance in medicine is, as a rule, by an intensive study; and so Doctor Weaver and his associates are to be commended upon this special group study and standardization.

Two aspects of burns have interested us at our clinic: the initial stage, that of shock, and the second, that of toxemia.

Underhill has called our attention to what occurs in the shock period with such lesions as burns—an interference with the function of the capillary endothelium, then a loss of fluid from the blood stream into the injured tissues, giving a local edema and an increased viscosity of the blood, and resulting in turn in a failing circulation and oxygen starvation of the tissues. The degree of injury is somewhat shown by the hemoglobin estimation, especially in a severe burn. The treatment is primarily fluids with regard to the salts, and must be given in proportionately large amounts, using in the severe cases the hemoglobin estimation as an index for treatment. For example, in a patient burned over 70 per cent of the body, where her hemoglobin was 125 per cent, she was in a severe degree of shock. After twenty-four hours of treatment, during which she was given ten and one-half liters of fluids, her hemoglobin reached 85 per cent, and she became mentally clear, and her general condition was good. A second patient burned over 40 per cent of his body surface, who had a hemoglobin of 115 per cent, and was in severe shock, was given in the first twenty-four hours eight and one-half liters of fluid, when his hemoglobin reached 90 per cent and his general condition became good. We are impressed with the fact that far greater amounts of fluids should be used at times, and the continuous intravenous method of introduction by cannula should be employed in such instances.

The second stage, or that of toxemia, which begins in thirty-six to forty-eight hours after a burn, has been due, we believe, to the absorption of broken-down protein material; but with the reports of Firor and the now related experience of Doctor Weaver, we shall have to direct more attention to the infection aspect. Doctor Weaver's contribution as to the creeping in of infection at the margin is excellent, and we have adopted his ideas in regard to this, but have not as yet had sufficient experience to report thereon.

DOCTOR WEAVER (Closing).—The use of the hemoglobin estimation, as suggested by Doctor Woolsey, as a control index for the administration of fluids, should assist materially in the management of this type of case. We should, however, bear in mind that occasional cases occur that do not show the rise in hemoglobin which we are led to expect.

Statements are frequently seen in the literature to the effect that burns are primarily sterile wounds. This is not true. We have recently made cultures of freshly burned surfaces, and find essentially the same bacteria present that are to be found upon the unburned skin. One patient gave us repeated cultures of B. welchi.

To cover these surfaces with oils, ointments, wax or anything which will obstruct drainage, is contrary to the teaching of good surgery. Tannic acid is, likewise, contraindicated in cases which cannot be rendered reasonably aseptic by a thorough cleansing. When infection cannot be eliminated, we should rely upon carefully chosen antiseptics and compresses to facilitate drainage.

I wish to thank Doctors Dukes, Woolsey, and Butler for the interest which they have expressed by their discussions; and also Dr. Theodore Schwarz, assistant superintendent of the Alameda County Hospital, whose interest and coöperation in the preparation of photographs and slides have made this work possible.

HYPERTENSION—THE RÔLE OF INFECTIONS THEREIN*

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II†

HYPERTENSION OF ELDERLY INDIVIDUALS

TABLE 2 shows the same two hundred cases, divided into a younger and an older group. It seems fair to assume, from clinical experience, that hypertension of elderly individuals is due to a more or less normal, or physiologic, process. In other words, it represents one of the forms of senility. With this group we are not especially

* From the Medical Clinic, School of Medicine, The Johns Hopkins University; being part of the Stanley P. Black Memorial Lecture delivered at Pasadena, April 9, 1934.

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TABLE 2.—*Hypertension, Two Hundred Cases*

	Under Age 50 71 Cases No.	Per Cent		Over Age 50 129 Cases No.	Per Cent
Positive history	43	60.5	Positive history	48	37.2
T. and A.	25	35.2	T. and A.	13	10.0
Present infection	7	9.8	Present infection	15	11.6
Rheumatic fever and rheumatic heart disease	10	14.0	Rheumatic fever and rheumatic heart disease	11	8.5
Entirely normal	16	22.5	Entirely normal	56	43.4

concerned, though it furnishes an interesting basis for comparison. Evans'[5] concept that premature hypertension is essentially due to a hastening of pathologic processes that may occur normally with advancing years, would probably meet the approval of most pathologists and clinicians. We are concerned with the question whether excessive tonsil infections play any part in this hastening process. It will be seen at a glance that the incidence of such infections is substantially higher in the younger group than in the older. The incidence of normal history and examination is little

TABLE 3.—*Cancer, Two Hundred Cases*

	No.	Per Cent
Positive history	81	40.5
T. and A.	17	8.5
Present infection	15	7.5
Rheumatic fever and rheumatic heart disease	26	13.0
Entirely normal	89	44.5

more than half as common in the younger group as in the older. The incidence of rheumatic infection also is higher, but perhaps not sufficiently so to be significant.

Some 178 of the 200 cases of hypertension were instances of "essential hypertension"; of the remaining twenty-two, seventeen showed sufficient renal involvement to be considered cases of vascular nephritis, five were listed as "chronic nephritis." Of three cases coming to autopsy, two showed vascular renal lesions, while one was a case of true chronic glomerulonephritis. This last case remains in the tabulations.

TABLE 4.—*Tuberculosis, Two Hundred Cases*

	No.	Per Cent
Positive history	102	51.0
T. and A.	49	24.5
Present infection	29	14.5
Rheumatic fever and rheumatic heart disease	16	8.0
Entirely normal	53	26.5

PROBLEMS OF CONTROLS

The matter of controls was not easily solved. Here cases from the surgical service would be ideal except for reasons given above. First, analysis was made of two hundred patients with cancer. Table 3 shows that the incidence of throat infections in this group is low. It is strikingly similar to the analysis of older hypertensive patients in all departments. The chief doubt about the use of cancer patients as control cases lies in the fact that some observers have thought that cancer patients, as a rule, give a history of relative freedom from upper respiratory tract infections.‡ One consideration in the selection of cancer patients as controls was that they include for the most part individuals of middle or late life. It is possible that criteria for tonsillectomy, or the frequency of this operation, vary from time to time; hence it seems desirable to draw control cases from both late and early adult life.

For the next control group, two hundred cases of tuberculosis were selected; this group insures the inclusion of individuals of younger ages. On the other hand, throat infections are probably higher among patients with tuberculosis than in the general population; tubercle of the tonsil is

TABLE 5.—*Syphilis, Two Hundred Cases*

	No.	Per Cent
Positive history	107	53.5
T. and A.	36	18.0
Present infection	27	13.5
History of rheumatic fever and growing pains	20	10.0
Entirely normal	65	32.5

by no means rare. At any rate, the evidence of past and present tonsil infection is rather high in this group (Table 4).

Not feeling satisfied with these two groups of control cases, it was decided to study the incidence of throat infection in still another type of disease. For this purpose the histories of two hundred syphilitic patients were analyzed. This group is necessarily derived largely from patients in the lower social strata, hence from those in poor sur-

‡ Verbal communication from Dr. George Draper, New York City.

TABLE 6.—*Throat Infections in Various Conditions*

	Percentage				
	Positive History	T. and A.	Present Infection	Rheumatic Fever and Rheumatic Heart Disease	Entirely Normal
Hypertension (patients under 50)	60.5	35.2	9.8	14.0	22.5
Syphilis	53.5	18.0	13.5	10.0	32.5
Tuberculosis	51.0	24.5	14.5	8.0	26.5
Hypertension (patients over 50)	37.2	10.0	11.6	8.5	43.4
Cancer	40.5	8.5	7.5	13.0	44.5

roundings and of poor habits of hygiene. Care was taken to select patients from the white and black races in the same proportion as in the hypertension group. The incidence in this group (Table 5) is intermediate, between that of the young hypertension cases on the one hand, and the older hypertension cases and cancer cases on the other.

In Table 6 all these groups are tabulated, while in Table 7 the control cases (six hundred in all) are thrown together. It is clear that the incidence of tonsil infection, judged by various criteria, is higher in the group of young hypertensive patients than in any one of the control groups, and that this incidence is also substantially higher than in the large group of six hundred control cases.

In selecting cases of syphilis, cancer and tuberculosis for purposes of comparison with the group of young hypertensive patients, I have attempted to demonstrate the incidence of throat infections in a large group of individuals suffering from diseases which are probably independent of the condition of the throat. The figures thus obtained probably represent the liability of a cross section of the general populace to such infections; if patients with cancer are less liable to throat infections, this factor is, perhaps, more than balanced by the higher incidence in tuberculosis patients.

Thus, the six hundred cases may be looked upon as reasonably reliable controls of a "negative" nature. It has seemed desirable to make a further comparison—this time of the incidence of throat infections in early hypertension, with that found in conditions known to be intimately related to such infections. For this group of "positive" controls, 150 patients admitted for either rheumatic fever or mitral stenosis, or both, were selected. Table 8 shows the analysis of tonsil infections in the group of cases with rheumatic infection, while Table 9 shows the comparison between this group and the group of younger hypertensive patients. The most striking difference between the two lies in the incidence of "present infection"; it seems only fair to state that some consideration should be taken of the fact that the existence of mitral valve disease, or of rheumatic fever, naturally prejudices an examiner against normality of the tonsils. On the other hand, search for foci of infection in hypertension is frequently very careful. The final comparison of "entirely normal" cases shows a difference of 11.2 per cent in favor of the incidence of infections in rheumatic disease.

Now, if the group of younger hypertensives is compared, on the one hand, with 600 "negative" control cases, and, on the other hand, with 150 cases of rheumatic infection, it appears that the incidence of throat infections in hypertension in patients under fifty years of age is about midway between the two groups.

STANDARDS OF SYSTOLIC PRESSURE USED

It was stated earlier that a standard of 140 millimeters of mercury systolic pressure was selected as the lower limit for the diagnosis of hypertension in half the 200 cases studied, while 150 was selected for the other half. As age was not considered, these standards were probably somewhat too low. For a final study, a group was taken which consisted entirely of patients, less than fifty years of age, who had a systolic pressure of 170 millimeters or more. Table 10 shows the result of this analysis. If these figures are compared with Table 2, the first column of which is composed of patients with pressure of 140 or 150 millimeters who are also under fifty years of age, no great difference is observed. In other words, the incidence of throat infection in the patients with systolic pressure over 170 millimeters is roughly the same as that of the group for which 140 or 150 millimeters was the minimum level.

TABLE 7.—*Cases of Hypertension Under Fifty Years (Seventy-one Cases) and Six Hundred Controls (Tuberculosis, Cancer, Syphilis)*

	Percentage				
	Positive History	T. and A.	Present Infection	Rheumatic Fever and Rheumatic Heart Disease	Entirely Normal
Hypertension	60.5	35.2	9.8	14.0	22.5
Controls	48.3	17.0	11.8	10.3	34.5

TABLE 8.—*Rheumatic Fever—One Hundred and Fifty Cases*

	No.	Per Cent
Positive history	106	70.6
T. and A.	54	36.0
Present infection	59	39.3
Rheumatic fever and growing pains (history)	58	38.6
Entirely normal	17	11.3

It should be noted, however, that the incidence of "nephritis" was strikingly higher in the group which included only cases of higher pressures. Of one hundred cases analyzed in Table 10, thirty-seven had sufficient evidence to warrant a diagnosis of "vascular nephritis," while in the group with lower standards of pressure only twenty-two of two hundred (11 per cent) were so classified. Of the thirty-seven cases of "nephritis" in Table 10, twelve came to necropsy: all save one showed arteriolar disease, and were classified as "arteriosclerotic nephritis," "arteriolosclerotic nephritis," or "arteriolosclerosis." The one exception consisted of a case of a peculiar form of chronic glomerulonephritis, in which damage to the arterioles, while present, was not a striking feature.

TABLE 9.—*Rheumatic Fever (One Hundred and Fifty Cases) and Hypertension Under Age Fifty (Seventy-one Cases)*

	Percentage				
	Positive History	T. and A.	Present Infection	Rheumatic Fever and Rheumatic Heart Disease	Entirely Normal
Rheumatic fever	70.6	36.0	39.3	38.6	11.3
Hypertension (patients under age 50)	60.5	35.2	9.8	14.0	22.5

AVERAGE AGES OF THE VARIOUS GROUPS

Finally, consideration must be taken of the average ages of the various groups of cases. The average age of those individuals over fifty years with hypertension was 61.57 years, while the average age of the cancer patients was 53.58 years. It is of some interest that these two oldest groups of patients had the smallest incidence of throat infection. Several factors may have played a part. The patients may have forgotten such infections as occurred in childhood and early adult life. Tonsillectomy was probably done less commonly when these two groups of patients were young. Moreover, there is a tendency for tonsils to atrophy with advancing years. However, it is also possible that these two groups of patients have reached the upper decades of life by reason of their freedom from serious throat infections, rheumatic fever, and the complications of these conditions. In the group of tuberculosis cases, the average age was the least—31.34 years—while the incidence of throat infections was higher than in any other of the negative control groups. The age of this group may bear some relation to the relatively high incidence of throat infections. This is not the whole story, however, as Dr. S. J. Crowe tells me that three or four per cent of all tonsils removed at this hospital contain tubercle. Such an incidence of tubercle of the tonsils would raise the incidence of diseased tonsils among patients with tuberculosis substantially. It is, however, of importance that in spite of the considerations of age, and the fact that the throat is involved in certain cases of tuberculosis, it remains true that the patients with hypertension under fifty years of age still showed a somewhat higher incidence of throat infection. Perhaps the group of negative controls that was least open to suspicion was the group of syphilitic patients. The average age of these patients was 38.08 years. The average age of the seventy-one younger hypertensives shown in Table 1 was 38.74 years, while the average age of the one hundred cases of hypertensives under fifty years of age, with a systolic blood pressure of 170 or over, was 40.32 years. There is no apparent reason why the syphilitic group should not be a fair control of a negative nature.

SUMMARY

1. The incidence of infected tonsils was studied from the records of two hundred cases of hypertension.

2. These cases were divided into those of patients who were less than fifty years of age, and those who were more.

3. Comparison of the incidence of infection in the groups of younger and older patients with hypertension was made with the incidence among 600 "control" cases (200 cases of cancer, 200 of tuberculosis, 200 of syphilis).

4. Comparison was also made between the incidence of infections in younger patients with hypertension, and patients who had evidence of past or present infection with rheumatic fever.

TABLE 10.—*Hypertension—One Hundred Cases Age: Under Fifty Years—B. P. 170 (S) and Over*

	No.	Per Cent
Positive history	68	68.0
T. and A.	24	24.0
Present infection	28	28.0
History of rheumatic fever and growing pains	14	14.0
Entirely normal	21	21.0

CONCLUSIONS

1. The incidence of tonsil infection in elderly patients with hypertension is not higher than that of a cross section of the hospital population. Hence, there is no evidence that throat infections are concerned with the etiology of the hypertension of age.

2. Tonsil infections are substantially more common among younger patients with hypertension than among the elderly patients with the same condition. The younger group also shows a higher incidence than is found among six hundred cases of tuberculosis, cancer, and syphilis.

3. Tonsillitis occurs more often among younger patients with hypertension than is the case in the "negative controls."

4. The incidence of tonsil infection in premature hypertension is about midway between the incidence found in "negative controls" (tuberculosis, cancer, syphilis), and that found in the "positive controls" (cases of infection with rheumatic fever).

5. Evidence of a nature similar to the observations that have linked throat infections with rheumatic fever shows that tonsil infections are probably concerned in the etiology of certain cases of premature hypertension.

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ROENTGENOTHERAPY OF SUPERFICIAL MALIGNANCIES*

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Discussion *by Louis F. X. Wilhelm, M. D., Los Angeles; L. R. Taussig, M. D., San Francisco.*

So far as the cure alone of cancer is considered, any method that will result in its complete and permanent removal is legitimate. There are, however, in the commoner forms of superficial cancer at least, other factors to be considered—cosmetic or amount of scarring, pain and discomfort, and loss of time. Cancer pastes, or as Doctor Ewing has called them, the chemical cautery, will cure a large group of the earlier skin epitheliomata, if used extensively enough and with sufficient brutality. The pain and especially the scarring, if properly used to produce a high percentage of cures, is tremendous; so that today when a hot iron is available to any practitioner, even in the farthest backwood, the use of caustic pastes as a routine method is inexcusable.

The cautery, electric, high frequency or the ordinary soldering iron is effective, but again in all but a few selected cases results in marked scarring, except in very small superficial lesions. Adequate surgical removal of face, lip and ear lesions is subject to the same criticism, scarring and deformity.

ADVANTAGES OF RADIATION

There is no question, however, that in certain locations adequate surgical removal is the method of choice when all possible factors are considered. There is no time to discuss these factors except to note that the percentage of such lesions in the total number to be treated is very small. Radiation (the roentgen ray and radium), properly used, offers by far to the largest proportion of all superficial malignancies a method of treatment resulting in as high, or a higher percentage of cures of all cases seen than any known procedure. In addition, with the exception of very small early lesions, the scarring and deformity, pain and discomfort are infinitely less. Therefore, because with an equal or better percentage of cures in the majority of cases there is less scarring and deformity or

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