injected with androsterone and testosterone propionate, in most cases for a prolonged period of two months. A detailed account of these experiments and of the technique employed will be published elsewhere. A preliminary statement is given here of the results obtained in 85 experiments on 46 male rats when the potential strength of the heart was measured in these three groups of rats. The measurements were made by attaching 10 and 15 gramme weights to the level pulled by the heart's contractions and tracing these contractions on a kymograph. The amplitude of the contractions was measured on the tracings and their number counted before and during the suspension of the weights, in both cases for a period of one minute. Woodworth's (1903, p. 228) quotient of the potential energy of the heart was used for expressing the results obtained, which have been statistically analysed by one of us (J. Cohen), using the same method as above.

These quotients of potential energy of the heart in the three groups of rats were as follows:

	Before Test	During Test
Control normal rats	81.3	73.5
Control castrated rats	71.9	60.0
Castrated rats injected with male hormones ..	78.2	81.7

A statistical analysis of the results obtained showed that during the "weight test" the hearts of the uninjected castrated control rats were weaker than either those of the uninjected normal controls (S.S. 1:50) or those of the castrated rats injected with male hormones (S.S. 1:100).

Thus the results on the isolated heart are in complete agreement with those obtained by weighing of the organs and their histological examination.

Summary and Conclusions

Experiments made with sex hormones on 281 male and 503 female rats are recorded, with the resulting effect on the weights and histological structure of liver and heart, and also on the isolated heart of 46 male rats.

Hepatotropic and cardiotropic properties are non-sexual effects of male hormones, especially of androsterone and testosterone propionate.

Taking into consideration also their nephrotrophic property, described in a previous paper, the male hormones in suitable doses might be considered as very important natural physiological stimulants of such vital organs as the liver, heart, and kidneys.

So far as it is permissible, from the results obtained on animals, to suggest a therapeutical application of sex hormones to human patients, it seems that androsterone and esters of testosterone should be tried clinically in suitable diseases of the liver, heart, and kidneys when a physiological stimulation of these organs is required.

We again emphasize the suggestion given in the paper on the clinical application of the sex hormones in kidney diseases that androsterone is preferable to the testosterone esters as a physiological stimulant of liver, heart, and kidneys in both sexes, since it produces only a weak effect on the male and female sex organs and is present naturally in both sexes. It is most inadvisable to stimulate the sex function in patients suffering from such grave diseases as those of the liver, heart, and kidneys.

There is also a possibility that small doses of some oestradiol esters with a prolonged and mild action (such as oestradiol benzoate-butyrate), administered with long intervals between the injections, may also be considered to produce stimulation of the liver, and perhaps of some other organs. Because of the toxicity of oestrogens in overdose, however, great caution is needed in their clinical application.

From this point of view, in cases of deficiency of oestrogens in the organism, the simultaneous administration of male hormones with oestrogens might be advantageous, since the former are able to neutralize to some extent the depressing and toxic effects of oestrogens.

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CHEMOTHERAPY AND CONSERVATISM IN ACUTE SUPPURATIVE OTITIS MEDIA

BY

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In the past have appeared many substantiated reports of striking results from sulphanilamide therapy, both in simple otitis and in suppurative otitis following paracentesis. An attempt is here made to assess its value in cases in which surgical intervention seemed to be urgent, but in which, nevertheless, it was purposely avoided.

Case I

A boy aged 9 returned to school with the remains of what had been called a common cold. There had been, however, an outbreak of "sore throat" in his family at the same time. He felt quite fit, and had a normal pulse and temperature, the only positive finding on physical examination being a sub-acute pharyngitis, the pharynx having the appearance of that seen the day following exfoliation in a moderately severe attack of scarlet fever. Eight days later he had had earache in the night, and the right drum was acutely inflamed in the upper half, while the postero-inferior quadrant was bulging with a bluish-grey sero-sanguineous sac extending into and resting on the adjacent canal. The left drum was normal. The temperature was 99° F., the pulse 90. Treatment with sulphanilamide was started. The sac quickly shrivelled up, leaving minute "puffs of cotton-wool" or "small snow-flakes" over the bulged area; the inflammation rapidly subsided, and in four days the drum was normal. On the following day the left ear started to behave in a manner similar to the right, responding to the same treatment in the same time. Deafness was only slight, and was very temporary.

Case II

The patient, a boy aged 8, following a cold two days previously, complained of bilateral earache which lasted the

whole night. In the morning his pulse was 114 and his temperature 101° F., while his pharynx was mildly inflamed. In both ears Shrapnell's membrane was inflamed and brightly injected; the normal contour and landmarks were obscured, but there was bulging of both tympanic membranes, in the postero-inferior quadrants—the right bluish grey, the left pinkish red. There was no mastoid tenderness. Local treatment was not considered necessary. Sulphanilamide treatment was begun immediately. Next morning the temperature had dropped to 98.8° F. and the pulse to 90, and his earache had gone. The sac in the left ear had shrunk a little; that on the right was slightly larger, until in the evening the whole canal was obliterated. On the third day the sac had become very much smaller, having a shrunken crenated appearance rather like that of a piece of dirty crumpled blotting-paper. It was now a quarter its original size; the normal contour of the drum was returning, and the outline of the malleus was visible, with the tip of the handle as a white knob. On the fourth day the right drum had reached the crenated stage, and was then a dirty cream instead of the previous bluish grey. On the sixth day both drums were approaching normality, but there was still some definite loss of lustre, with some brown staining of those areas which had previously been brightly injected, while over all were a few radial wavy dilated vessels. Hearing (as tested by a 30-in. watch), which had been impaired on the second day to the extent of Right $-\frac{1}{2}$ in. and Left $-2\frac{1}{2}$ in., was now normal. The normal pearly lustre and the tone of the drums were not recaptured till the eleventh day.

Case III

This patient, a girl aged 5, complained of earache within a few hours of the onset of a head cold. In the morning the temperature was 101° F., in the evening 104° F. The left drum showed a reddish-cream bulge in the postero-inferior quadrant, with a small bluish-grey bulla between the processus brevis and the sac. The fan-shaped area of acute inflammation and redness of the upper half of the drum was present as usual. Sulphanilamide treatment was instituted. On the following day the bulging was less marked, but the right drum showed streaking of the handle, with general flushing of the whole membrane. The temperature had dropped to 102.6° F. On the third day the left had quieted considerably, while the right showed a well-defined fan-shaped area or an arc, 4-7 o'clock, dirty white in the morning, changing to a deeper grey-white in the evening. The temperature was now 100° F., the pulse 96. On the fourth day the white arc had enlarged irregularly; it had become yellow and bulging, and definitely overhung the canal, with a few dilated vessels over the bulge. The fifth day saw a slight increase of the bulge, but the temperature was still dropping. On the sixth day the bulging was very much less, while the colour was a faint yellow with some streaks remaining. On the ninth day the left drum was normal in appearance except for some lack of lustre over the area originally affected. The right was pinkish. On the fifteenth day both drums were normal. Deafness was not appreciable at any stage, either to the whispered word or to a watch test, but with a child of this age it is notoriously difficult to place reliance on the latter test.

Case IV

A boy aged 9 had had acute otitis following measles one year previously. He was seen one evening half an hour after the onset of acute earache. The temperature was 99° F., pulse 96; both Shrapnell's membranes were inflamed—the right with three blackish bullae in the antero-inferior quadrant, the left with streaking of the handle. Sulphanilamide treatment was started. On the next morning the right canal was completely occluded by a bag almost inky black in colour. The temperature was then 98° F., and the earache was less. At 5 p.m. there was a discharge of blackish thin sero-sanguineous fluid from the meatus, while the earache was gone. Gentle cleansing revealed a perforation in the postero-inferior quadrant, an acutely inflamed Shrapnell's membrane, and a sodden appearance of the rest of the drum and of the canal, on which lay a considerable amount of bleached desquamated epithelium. The temperature had risen to 100° F. For the following two days there was a clear watery discharge, very slight in amount, with an occasional throbbing or full

feeling in the ear on movement. On the seventh day there was some redness of the posterior of the drum; on the ninth the normal landmarks had reappeared and the postero-inferior quadrant was like dirty crumpled blotting-paper with pinkish streaks in the folds. On the twelfth day the drum and the hearing, which had been diminished, were normal.

Case V

A girl aged 5, admitted to hospital on September 27 with a moderately severe attack of scarlet fever, developed earache on the evening of October 15 with a temperature of 100.6° F., and was put on sulphanilamide. Her progress up till then had been normal. Her left drum was bulging with yellowish-white pus. Next morning the earache had gone. By the 18th the bulging had disappeared; the drum was becoming normal, and was patterned with the usual wavy dilated vessels. On the 21st lustre and tone were returning; the wavy vessels were then only very thin brown streaks. On the 25th both drum and hearing were normal.

Case VI

A girl aged 12 was admitted to hospital with scarlet fever on October 16. Her throat was very red, oedematous, and angry, and she complained of severe earache. She was given sulphanilamide. Her temperature ran between 99.6° and 98° F. for two days, and then fell to $97-98^{\circ}$ F., while her pulse dropped from 100 to 76. The earache persisted in modified degree for two days. On examination a blackish-grey sac lay on the canal up against a redly inflamed membrane whose landmarks were obscured. By the 18th the sac had shrivelled and become lobulated, while two small blebs had appeared at the lower end of the handle. By the 21st the sac had completely gone and the blebs had been replaced by two red spots. There still remained some deafness and occasional discomfort in the affected ear. Hearing was normal on the 26th and the drum normal on the 28th.

Case VII

A girl aged 7 was admitted to hospital with scarlet fever on November 3. She had a very red raspberry-tongue, was powdering on the face and body, and had patchy exfoliation on the chest. She appeared to be seriously ill, and was very deaf. Her temperature remained 101° F. for two days, then gradually fell until it was 97.6° F. on the fifth day, while the pulse dropped from 132 to 96. Treatment with sulphanilamide was started on admission. The left drum showed slight otitis media, while the right was bulging with pus, and a bead of this yellow-green pus, obviously thick and tenacious, had just burst through a small perforation in the postero-inferior quadrant. On the 4th the earache had gone, while the bead of pus had dried or had become inspissated, assuming a conical shape. On the 7th the bulging was gone. The area was now a deep brownish colour, while the conical bead appeared to have become softer and to have sagged somewhat, probably owing to leakage of a minute quantity of serum. On the 11th deafness as tested by a 30-in. watch had risen from *nil* at contact to 12 in., the antero-inferior quadrant was normal except for some fine streaking, Shrapnell's membrane was still moderately inflamed, but the processus brevis had regained its normal white appearance. Progress thereafter was rather slow; hearing was normal by the 19th and the drum normal on the 21st—that is, eighteen days from the onset.

Discussion

From the case histories all seven appear to be cases of acute suppurative otitis media due to haemolytic streptococcal infection, especially Case I. It may be questioned whether all were in fact "suppurative" otitis, or whether some of them may not have been "catarrhal" in type. Clinically, it is usual to divide otitis into the catarrhal and suppurative forms, but the distinction is largely one of degree. Mollison (1936) says that "fever, earache at night, deafness, and a variable degree of bulging and injection of the drum with obscuration of the usual landmarks are signs each strongly suggestive of suppurative otitis, present or impending, whereas in simple catarrhal

otitis the symptoms and signs are usually ill defined." Past experience with similar ear lesions treated by paracentesis convinces me that the present cases were very definitely suppurative in type. The sudden onset, the ear-ache at night with bulging in a few short hours, deafness and pyrexia in all of them, actual-rupture of the drum in two cases, and in three the development of "snow-flakes" or "puffs of cotton-wool" due in all probability to localized massing of pus cells, scattered over the inside of the drum, strengthen this conviction.

It has been generally agreed that with a bulging drum, be it due either to acute catarrhal or to acute suppurative inflammation, abortive measures are neither adequate nor safe. Watson-Williams (1933), Graham-Brown (1936), and Colledge (1937), in the more recent literature, suggest that "immediate" incision of the drum is necessary. If sulphanilamide therapy is capable of favourably influencing otitis (acute infection of the middle ear) at both the earlier and the later stages (Horan and French, 1938) the same good results should be possible in the intermediate stage—that is, in cases of suppurative otitis with bulging in which rupture has not taken place. It was decided, therefore, with some trepidation, and not without some anxious moments later, to try the effect of sulphanilamide without resort to surgical measures. All cases were treated as of the same age group for purposes of dosage. $7\frac{1}{2}$ grains of sulphanilamide (1 tablet) was given, crushed or to be chewed, every four hours for the first two days, the number of tablets being reduced on alternate days by one till the patient was receiving two tablets only on each of the last two days. That was the minimum dosage, but where the local ear signs were not clearing satisfactorily reduction of the number of tablets was delayed. The average total per case was 225 grains over an average of seven days.

To be able day by day to observe clearly the progress made, through a canal unblocked by the usual discharge of pus, to note the gradual diminution of the bulge, to see the normal landmarks return and the inflammation disappear as resolution became complete and normal lustre and function were restored within a few days, was a novel experience. No less pleasing was the appreciation of the fact that by avoiding surgical measures these children were escaping not only the mental and physical trauma inseparable from anaesthesia and surgical operation but the further danger of superadded infection. Even in Case IV, in which rupture of a sero-sanguineous sac took place within a few hours of the onset, probably from greater virulence of infection, the discharge quickly became clear and very small in amount, so that after the first few hours there was no interference with visualization of the drum. Case VII was probably the most spectacular in that the infection was completely arrested at the actual stage of rupture. The likelihood of spontaneous remission may be dismissed as all the cases had a sudden onset, and even in a case of simple catarrhal otitis Mollison (1936) believes that with a sudden onset there is little chance of resolution. How much truer must it be with a drum bulging with pus! With such a small number of cases controls were out of the question, but I may be permitted to compare, or rather to contrast, other children treated in the same way during the same epidemic, seen at a later stage when rupture of the drum had taken place and a discharge had existed for at least twenty-four hours. In those the discharge remained purulent, the average time taken for complete recovery being twenty-three days, whereas in the present series the average was eleven days. Even with so small a number the results were so outstanding as to suggest that, if seen early and sulphanilamide therapy is immediately instituted, conservatism may be practised with safety in cases of bulging in which

rupture has not taken place, with a dropping temperature, disappearance of pain, diminution of deafness, lessening of the bulging, and a reasonably steady pulse.

Summary

Seven cases of acute suppurative otitis media with bulging of the drum, occurring in children and successfully treated without paracentesis, are described.

The treatment adopted was the early use of sulphanilamide in adequate dosage. No local treatment was considered necessary.

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CYSTICERCOSIS EPILEPSY

BY

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The following case is of interest on account of the relative rarity of the condition and the unusual clinical features presented.

Case Report

A soldier aged 37 was admitted to the neuro-psychiatric wards of an emergency hospital on November 8, 1940, for observation on account of marked abnormalities of conduct. There was a history of his having wandered away from his post while on guard duty and being unable to give any satisfactory explanation of his conduct. The patient was of good physique and was the eldest of seven children, all of whom are alive and healthy. Childhood was normal and he had had no illnesses. He served his apprenticeship as an iron-moulder, and in 1923 joined the Army. In January, 1927, he was drafted abroad, and served in various districts of Northern India until December, 1933, when he was placed on the Army Reserve and returned to London. While in India he contracted sand-fly fever in 1929 and suffered from intestinal colic of unknown origin in 1931.

He remained healthy and in constant employment until October, 1934, when he awakened one morning with "cramp-like" pains in both arms and both legs, and was informed by his room-mate that he had been throwing his arms and legs about during the night. He attributed his symptoms to the effects of nightmare, and did not seek medical advice. In May, 1935, he was found lying on his bedroom floor one morning, and had no memory of what had happened. He sought medical advice, but does not seem to have received any treatment. In November, 1936, he had an attack of "mental confusion," which came on suddenly, but there is no history of loss of consciousness or of falling. He was treated at this time with 1 grain of luminal at night, but the diagnosis of epilepsy does not seem to have been established. He remained well, and was called up for service in September, 1939. In May, 1940, when in France, he felt a choking sensation while bending over his haversack, and then lost consciousness. On recovering, his arm muscles were painful, but his companions informed him that there had been no evidence of twitching and that his colour had remained pale. He returned from France in June and remained well until September, 1940; at this time, while on guard duty, he felt a choking sensation coming on, and left his post in order to sit down. He did not remember anything further until he awakened up in the guardroom and was informed that he had threatened an officer with violence. In view of his plea of loss of memory he was transferred to this hospital for observation and investigation.

On admission no abnormality was noted in his physical condition. Examination of the central nervous system was negative. His blood gave a negative reaction to Wassermann