British Institute of Industrial Therapy 99 Leigh Road, Eastleigh, Hants SO5 4DR

Community Service Volunteers—Able-to-Help Scheme 237 Pentonville Road, London N1 9NJ (volunteer work for physically disabled people)

Countrywide Workshops 17c Earls Court Square, London SW5 9BY (new venture to promote quality goods produced by disabled people)

Crafts Council 12 Waterloo Place, London SW1Y 4AU (information service; grant and loan schemes)

CRYPT (Creative Young People Together) Crypt Foundation, 21 Plover Close, East Wittering, Chichester, West Sussex PO20 8PW (new charitable trust to help disabled people to develop their creative talents)

Department of Trade and Industry Information Technology Division, 29 Bressenden Place, London SW1E 5DT

Employment Medical Advisory Service Health and Safety Executive, Magdalen House, Stanley Precinct, Bootle, Merseyside L20 3QZ

Home Opportunities for Professional Employment 96 Greencroft Gardens London NW6 3PH (provides information, ideas, contacts, etc—not an agency)

Manpower Services Commission Moorfoot, Sheffield S1 4PQ (NB produces a wide range of leaflets for disabled people and employers)

Opportunities for the Disabled—London office 1 Bank Buildings, Princes Street, London EC2R 8EV

Queen Elizabeth's Foundation and Training College for the Disabled Leatherhead, Surrey KT22 0BN

Remploy Ltd 415 Edgware Road, London NW2 6LR

Royal Association for Disability and Rehabilitation 25 Mortimer Street, London W1N 8AB (research, information and publications; publicises advantages of employing disabled people; running "EmployAbility" campaign in second half of April)

Royal National Institute for the Blind 224 Great Portland Street, London W1N 6AA

(See *Directory for Disabled People* for further addresses relevant to training and employment*)

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Medicolegal

The Gee case: evidence from America

CLARE DYER

When the court rose last week for the Easter vacation the trial of Dr Sidney Gee's libel action against the BBC had notched up more than 70 days in court. Before the adjournment the court heard evidence from Dr Gee's fourth expert witness, Professor T D Danowski, clinical professor of medicine at the University of Pittsburgh and director of the Institute of Graduate Medicine at Shadyside Hospital, Pittsburgh.

Professor Danowski told the court that he was a fellow of the American Association for the Advancement of Science and of several other scientific and medical societies, including the Endocrine Society. He was currently a member of the editorial boards of *Metabolism* and *Clinical Pharmacology and Therapeutics*. In the 1960s he had written a four volume work on clinical endocrinology and edited a two volume work on diabetes mellitus. He was also the author of a popular book on weight control. He had written articles on obesity in connection with diabetes, the thyroid, and the heart.

In 1964, he continued, he had published the results of a study in

which he had attempted to duplicate with desiccated thyroid some of the features of spontaneous thyrotoxicosis, and particularly had tried to work out the total amount of thyroid hormone that had to be administered to begin to duplicate spontaneous thyrotoxicosis. A purified preparation of desiccated thyroid (Prolid) was administered to healthy young male adult prisoners in dosages of three to 25 grains a day. At that time, he said, Prolid contained more triiodothyronine (the biologically active hormone) and less thyroxine than was present in ordinary commercial desiccated thyroid. Comparing his dosage in that study with Dr Gee's dose of 250 mg thyroid extract a day, he said that Dr Gee's dosage would be the equivalent of four grains in terms of total hormonal content, both thyroxine and triiodothyronine.

Professor Danowski said that the subjects in his study were given three grains of Prolid for two weeks. This was increased successively at two week intervals to 10, 15, 20, and, finally, 25 grains a day, and the 25 grain dosage was maintained for a total of four weeks. Ten of the 17 men continued in the study, which lasted for four months, until the daily dosage had reached 25 grains. The seven others were either transferred from the institution or withdrawn from the study—for example, because they were put into solitary confinement, or were injured in fights. He did not believe

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that any had withdrawn because of symptoms they had experienced as a result of the thyroid preparation.

The large doses of Proloid, 10-25 grains a day, proved to be surprisingly innocuous, judging from the relative rareness of symptoms and signs. The prisoners continued to play basketball; they indicated that their strength was diminished but they continued at their jobs. Electrocardiograms did show persistent tachycardia. The range of pulse rates at 20 grains a day was between 78 and 124/min. The men were seen every day, and if at any point he had seen that they were endangered, Professor Danowski said, he would have discontinued the study.

Findings of other studies

This was one of a series of studies relating to the administration of thyroid hormone, he told the court. The earlier studies had used three grains. In a later study 12 morbidly obese patients (100% or more above ideal weight) were starved entirely for two weeks. Desiccated thyroid was administered to seven in dosages increased by one grain daily to a total of 15-16 grains a day. The desiccated thyroid increased by 40% the weight lost. Those who did not receive thyroid lost 9 kg and those who received it lost 12.7 kg.

The patients were admitted to a metabolic ward, where they were constantly monitored day and night. Four patients had tachycardia, with pulse rates between 90 and 120/minute, but hyperkinetic behaviour, nervousness, sweating, palpitation, and other symptoms and signs of thyroid hormone excesses were conspicuous by their absence. In the patients not receiving desiccated thyroid protein loss contributed 8.3% of the total weight loss and in those receiving thyroid 8.4%. Earlier reports had indicated that the administration of thyroid hormone even in people who were eating would produce a negative balance of protein and that all of the loss would be attributable to that negative balance. These data indicated that the loss was fat. The study concluded that "there may well be a span of thyroid dosage somewhere between the usual maintenance quantities of two or three grains and amounts which produce hazardous thyrotoxicosis, which can be administered with relative impunity to selected subjects." Professor Danowski said he concluded from his studies in the prisoners that the amounts that would produce hazardous thyrotoxicosis would perhaps be in excess of 25 grains.

He went on to describe another of his studies, whose findings were published in *Metabolism* in 1967. Desiccated thyroid averaging 9 grains a day was given to 93 grossly obese men and women over a period of four to 41 months. The results in terms of weight loss were disappointing, but the prescribed doses of thyroid were well tolerated. The occasional complaints of nervousness, tremor, and sweating disappeared when the dosage of thyroid was reduced. Electrocardiographic changes were minimal.

The patients tolerated these quantities of thyroid better than the prisoners did, in terms of symptoms, presumably because the prisoners had no buffer of energy and were losing protein.

After this study, Professor Danowski continued, he abandoned the use of large pharmacological doses of thyroid in treating obesity, but he concluded that it would be logical to administer smaller quantities—2 grains—under certain circumstances—for instance, if a patient was hypothyroid, or a dieting patient developed a decrease in metabolism that could be traced in part to a decreased circulating quantity of triiodothyronine.

Commenting on the proposition that Dr Gee's dosage of thyroid extract was a dangerous dose, Professor Danowski said that the initial reading of symptoms had been made on the assumption that there was no quantification of reaction to thyroid hormone on the basis of dosage, that the moment a patient was exposed to any thyroid hormone then some maximum effect occurred. His studies had shown that there was a quantitative relation between changes produced by thyroid hormones and the dosages used. Secondly, he said, there was a failure to recognise that the symptoms that were present were not pathognomonic of thyrotoxicosis.

Having seen the records of the patients featuring in the trial, Professor Danowski said he did not believe that he had seen any

evidence to persuade him that any of those patients had been made thyrotoxic by Dr Gee's treatment. On the balance of probability, he would say that the tablets Dr Gee had prescribed for Mrs White had not in any way contributed to her death. Mrs Falconer's necropsy showed such extensive heart disease that death had been almost inevitable. He did not believe that she would have had a better chance had she not had the small amount of thyroid hormone. She had had the heart of a much older person.

Cross examination

Cross examined by Mr Andrew Rankin QC, leading counsel for the BBC, Professor Danowski agreed that thyrotoxicosis was more hazardous in someone with an underlying heart condition. Mr Rankin referred Professor Danowski to graphs charting the free triiodothyronine and total triiodothyronine concentrations and pulse rates of EW, a 28 year old woman, 170 cm tall and weighing 57 kg, who had recently taken a course of thyroid extract tablets, 250 mg a day, stopping just before the 15th day. Professor Danowski agreed that the hormone concentrations and pulse rates were raised as a result of the thyroid extract. But the effect was minuscule compared with thyrotoxicosis. Mr Rankin asked whether it was undesirable to increase her pulse by nearly 40 beats. Professor Danowski pointed out that the line dropped down during sleep, and this was an important difference between toxicosis and a pharmacological effect. Another way of looking at it was that the hearts of ladies who weighed 90 or 140 kg and who were incapable of jogging were getting the same exercise as those of joggers and swimmers.

Mr Rankin said that EW began taking the tablets on 7 February. By 20 February she was having palpitations on exercise and occasionally at rest. She was sweaty. Her bowels were opening three or four times a day. Her blood pressure was 110/60 mm Hg. Two doctors saw her and were satisfied she was thyrotoxic. Professor Danowski criticised the lack of a double blind study and the fact that the subject was informed. Four days after she stopped taking the tablets, Mr Rankin continued, she had pain in her chest and palpitations and her pulse rate, which she took herself, was 180/min. Professor Danowski said that this dosage of hormone would not last for four days. He suggested that she might have heart disease that had not yet been identified.

With regard to Mrs White's death, Mr Rankin said that the BBC defendants were saying that the interstitial fibrosis found on postmortem examination had been brought about by the ingestion of thyroid extract. Professor Danowski said that her triglyceride concentrations were increased. He suggested that this rise put her at risk and that she died of heart disease for that reason. Mr Rankin put it to Professor Danowski that with normal cholesterol concentrations the presence of high triglyceride concentrations was a very weak risk factor. He replied that in Sweden it was apparently a high risk factor. Mr Rankin said that the suggestion that a raised triglyceride concentration was cardiotoxic and might itself result in death was a wholly new concept, never heard in this country until Professor Danowski uttered it in the witness box. Asked whether Mrs White's conditions, focal myocarditis with interstitial connective tissue damage, were consistent with, and possibly caused by, thyrotoxicosis, Professor Danowski replied that they could be caused by spontaneous untreated thyrotoxicosis, but there were several other possible causes.

Professor Danowski agreed that the prolonged administration of thyroid hormone in excess of a replacement dose could be or might be hazardous. He said he held no brief for Dr Gee's programme. But as far as he could see the BBC was quoting a lot of people but none of them had done what he had done, which was to give graded doses of thyroid hormone in excess. He had knowledge that was not held by these very eminent writers of textbooks. He maintained that death did not occur with the quantities of thyroid growth that Dr Gee had administered, and everything the BBC was quoting was by people who had never been there, had never done it, and had never thought about the problem. All he was saying was that he had done it and he hadn't killed anybody and that these small quantities didn't do much.