# OORSPRONKELIJKE BIJDRAGEN

## SOME REMARKS ON THE METHOD OF TREATMENT WITH ULTRA-VIOLET RADIATIONS IN DENTAL PRACTICE

BY

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Some few years ago being impressed by the marvellous curative results attributed to Ultra Violet Radiations by several enthusiastic friends and a desire to test as to whether they were true or empirical a Schall Arc Lamp, with carbon impregnated with nickel, was purchased through the Emil de Trey Research Fund and installed in the University of Liverpool Dental School. After very little experience with the Lamp several disadvantages of its use in Dental practice were evident. The exposures required were too long, the apparatus was not suited for use in the ordinary dental surgery, the application of the rays to the mouth was difficult, and when applied was too far from the source to be very effective. Attempts were made to overcome the latter difficulty by designing and using a special Quartz Condensing Lens in order to concentrate the rays on the part affected and to bring the part nearer to the source of radiation. This proved a distinct improvement, but not sufficient. Swedish steel was also tried in the same apparatus, giving similar results and possessing the same disadvantages. In fact most of the U. V. equipments in the market are cumbersome and difficult to adjust, and generally unsuitable in dental practice unless a special room is established for the purpose.

*) Voordracht gehouden in de Ver. v. Ned. Tandartsen April 1928.

Another difficulty was experienced in finding a means of keeping the patient's lips apart without strain. Several instruments were designed and discarded. Eventually the Kurron Gag was brought to my notice, and this we find easy to adjust comfortable to the patient and most convenient for the purpose.

After consulting Professor Baly a Mercury Quartz Lamp was attached by a pivot to the end of a wall-type operating bracket (table removed) which allowed greater ease in adjusting the rays to the patient when seated in a dental (pump) chair. This lamp proved very rich in U. V. radiations, and the greatest care had to be taken to protect the eyes of both patient and operator. In the first instance we tried general exposures on the body. Several patients were sent to us from the Royal Infirmary with unhealed wounds of long standing (three to eighteen months) following the removal of tubercular glands in the neck. The rays were directed on to the wounds at a distance of about ten to twelve inches. Improvement was evident, healing commenced from the edges, in the case of the naked carbon (nickel and Swedish steel) but very slowly even with fairly long and numerous exposures. When used in conjunction with the Quartz Lamp reaction was more rapid. Still numerous and long exposures were necessary. With the naked Mercury Quartz Lamp improvement was distinct, and the time of exposure was reduced from three to five minutes. When applied through the Quartz Lens care had to be taken not to blister the surrounding skin. Several cases of lupus, pain in tooth and sockets and joint affections when treated showed marked recuperative changes. One intractible disease of both antri showed almost immediate improvement after the radiations were applied to the face. Being thus convinced of the general curative values of the rays by general exposures we felt justified in attempting to apply the same within the mouth for the treatment of oral conditions. As the first Quartz Lens was not as effective as we desired the Mercury Quartz Lamp was then surrounded by a box, the

front portion cut out and a hinged metal door with a rubber diaphragm fixed over the opening. Through holes in this diaphragm the ends of specially designed Quartz Applicators as illustrated were inserted. These Applicators are eight inches long and the ends curved at different angles. By this means adjustment was easily made to any position in the mouth by raising the chair and moving the bracket arm. With two Applicators in position U. V. radiation could be applied to both sides of the alveolus at the same time. The interstices of the teeth, however, were still too far away and Mr. Collinge, a colleague on the Staff, designed a new form of Applicator concentrating to a point. The use of this proved distinctly encouraging.

Our next step was to purchase through the medium of the same research fund a Kelvin, Bottomly and Baird Laboratory Quartz Mercury Vapour Lamp. Depriving it of its several small accessories, making a larger opening in the front, fixing to it a hinged door with rubber diaphragm as previously explained, and then attaching it by pivot and slide to the end of an S. S. W. wall type operating arm as illustrated. This combination in conjunction with a pump chair seems to meet the ideal for use in ordinary dental practice and not too costly. A later stage in the treatment has been to introduce hydrogen peroxide ($H_2O_2$) on cotton wisps into the gingiva through or pockets on to which U. V. Radiations are applied with the idea of developing nascent oxygen by means of and in conjunction with the rays on the surrounding tissues. By this means we have noted a definitely marked improvement. We are now about to use solutions of common salt in a similar manner hoping to obtain a slight chemical as well as U. V. reaction. The range of the spectrum of the K. B. B. Lamp is from 3,00 to 1,800 angstrom units, the longer rays giving a more tonic effect and the shorter (2,000 to 1,800) the more caustic or bacteriocidal. The Lamp is rich in the latter, and we believe likely to prove more useful for oral conditions. The most we can say at the present time is that U. V. radia-

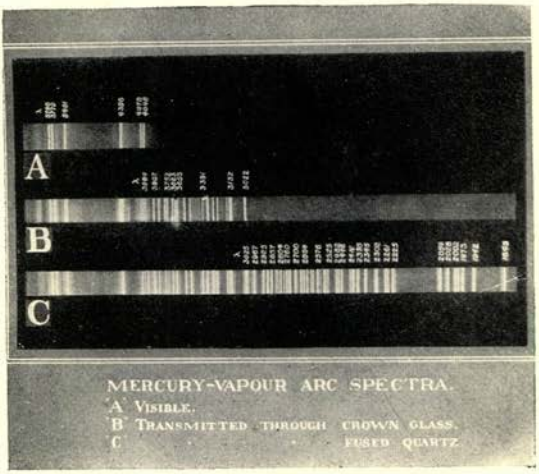
A
B
C
MERCURY-VAPOUR ARC SPECTRA.
'A' VISIBLE.
'B' TRANSMITTED THROUGH CROWN GLASS.
'C' " " FUSED QUARTZ

Fig. 1.

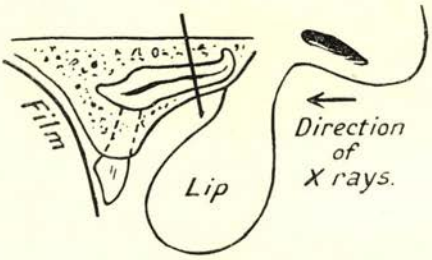
Film
Lip
Direction
of
X rays.

Fig. 2.

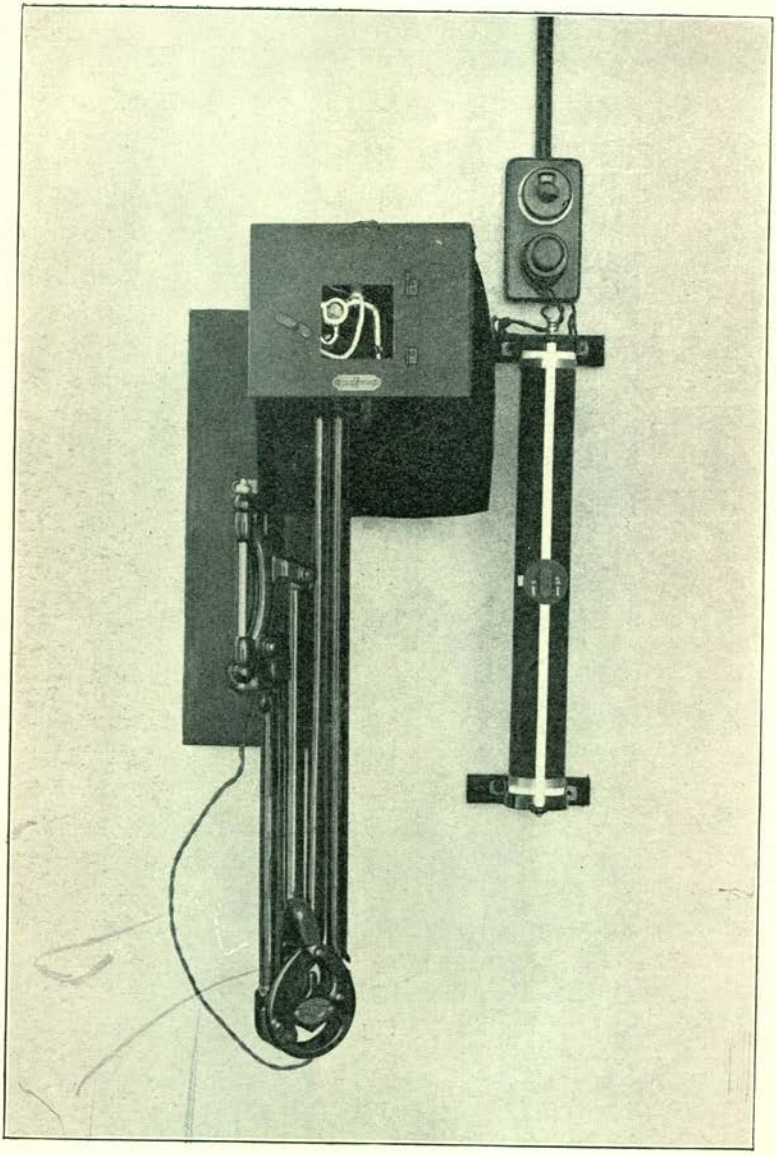

Fig. 3.

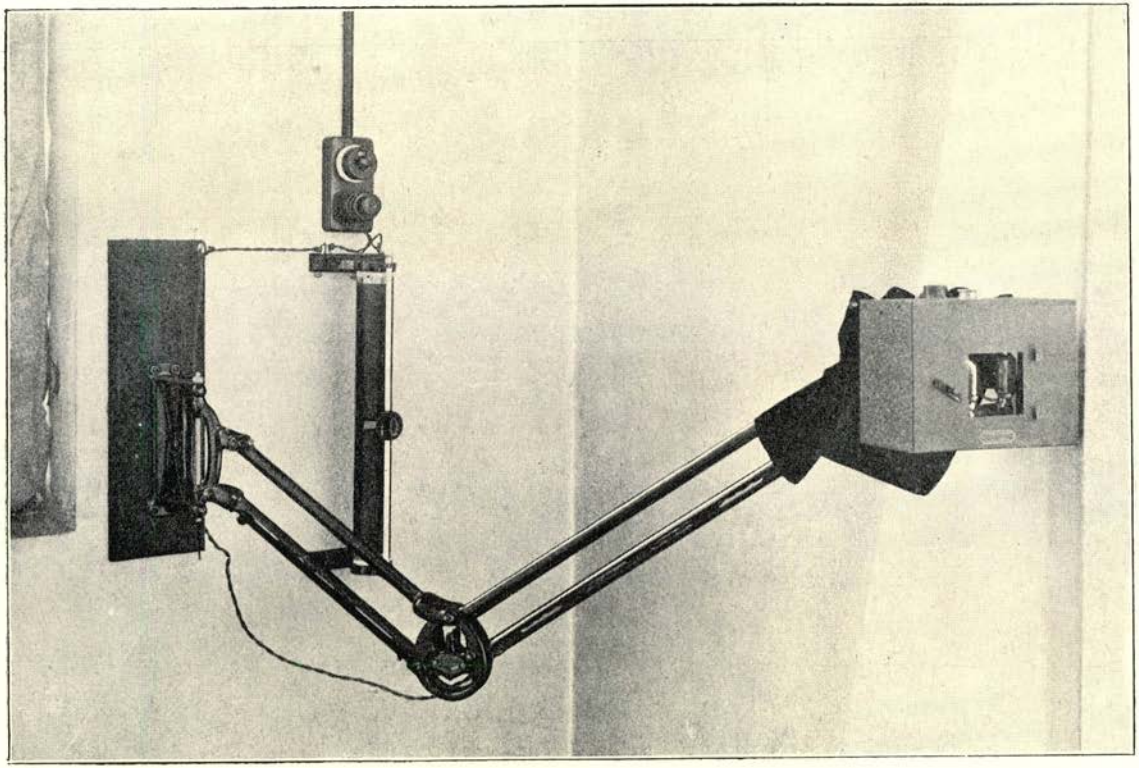

Fig. 4.

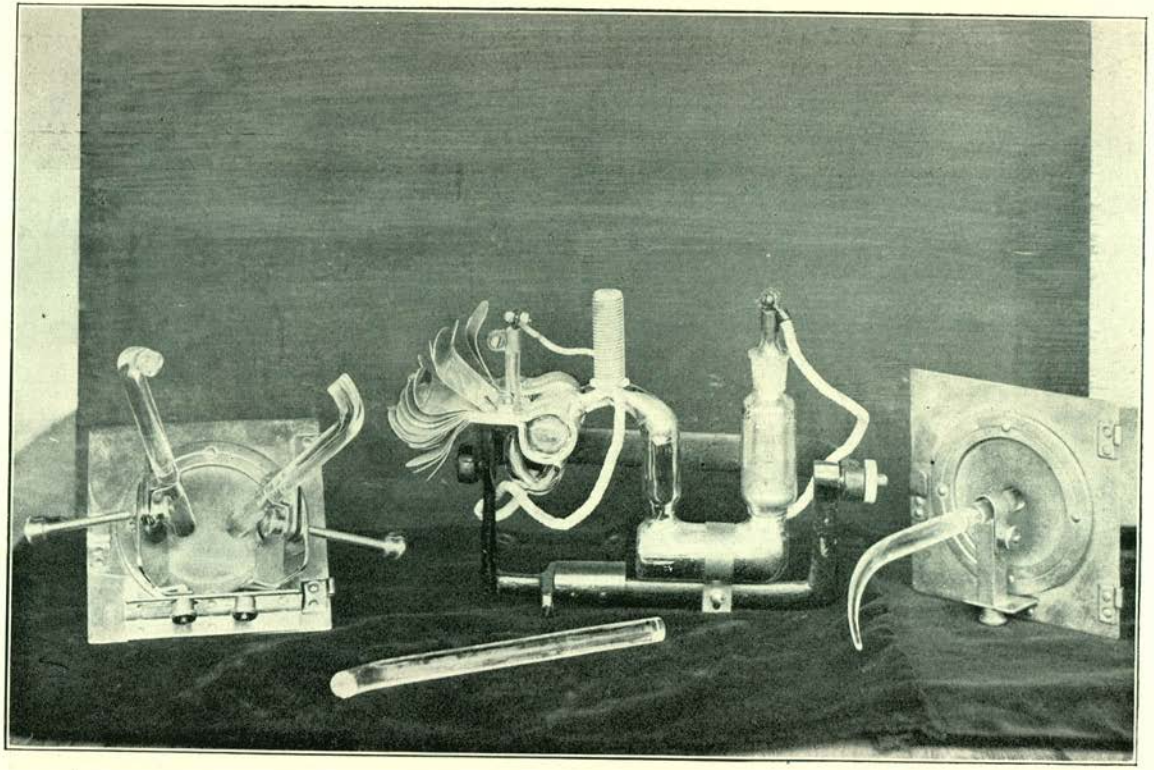

Fig. 5.

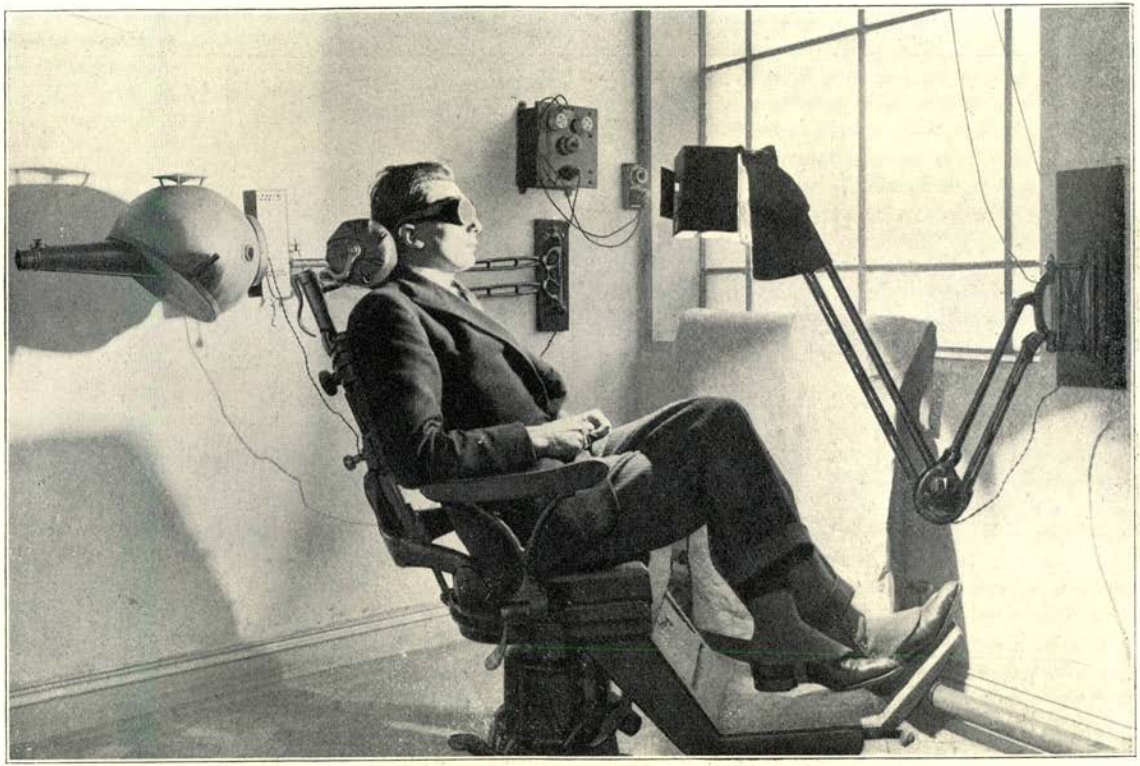

Fig. 6.

Fig. 7.

Fig. 8.

tions are a useful addition to our means of treatment and that we are distinctly encouraged by the results so far attained to more hopefully pursue our investigations.

It is to be remembered that it is difficult in most cases to assess the determining curative factor in any treatment, since, as a rule, several means are adopted at the same time. Nature itself is doing its share, the general health of the patient is receiving attention, instrumentation as in Pyorrhea is used, mouth washes are prescribed, attention is drawn to the necessity of keeping the mouth clean, other causes such as malocclusion relieved. Again in the use of U. V. radiations there is a beneficient psychological effect, and with the Mercury Quartz Lamp the inhalation of the ozone formed has also a bracing effect.

Professor Baly holds the view that it is possible that different diseases may yield tot different wave lengths. Having this theory in mind we have fitted of experimental purposes the top portion of the Schall arc lamp on the end of an extra wall bracket so that we may be able to use in this either Swedish steel, carbons, nickel carbons, or Tungsten, and as these vary in U. V. radiations trying them in order to pursue the theory and comparing the results.

I am indebted to my colleagues, Messrs J. S. H. Collinge and J. G. Roberts for their ungrudging co-operation.