ORIGINAL

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BUREAU OF MILITARY HISTORY, 1913-21.

STATEMENT BY WITNESS.

DOCUMENT NO. W.S. 1713.

Witness

James L. O'Donovan,
2, Wilton Place,
Dublin.

Identity.

Director of Chemicals, General Headquarters Staff.

Subject.

Work for and in the Munitions and Chemicals Dept., G.H.Q., for Irish Volunteers and I.R.A. 1917 - 1920.

Conditions, if any, Stipulated by Witness.

Nil.

File No. S.1536.

Form B.S.M. 2

P.532 1000 6-57 3/4526

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STATEMENT BY JAMES L. O'DONOVAN

2, Wilton Place, Dublin.

Through personal friendship with the Ryan family I became acquainted with Dick Mulcahy and many other personalities associated with the Volunteer organisation. This would have been about Christmas 1917.

At the time I was a university student and actively interested in chemical and explosive research. (Worked for Nobel's Explosives Factory). Knowing my qualifications, Dick Mulcahy told me that I should not join any Volunteer unit; I could give more valuable service by developing the munitions side of the Volunteers.

Although my brother was openly active, I did not come under suspicion from the military or police authorities. I was considered the only respectable member of my family, and was perfectly safe everywhere up to, I suppose, 1920. As a result, I was able to go to Magill of the D.M.P., whom I knew personally, and intercede on behalf of my brother when he was a prisoner. (1919 with Dick McKee, etc.).

My early work - partly conducted in Richmond Road, where Collins stayed later, was with Mick Lynch, when he was O/C. of the Dublin Brigade, on explosives and things of that nature,. and I always did the actual testing myself of anything I was responsible for making and all testing of materials. St. Margaret's, Puckstown and Ballymun were the principal places where tests were carried out at that period.

During the years 1917 to 1919, when a post-graduate research student in University College, Dublin, I availed of the facilities provided by the college to carry out research

work. I used to do my explosives work there as well as at home and in the little laboratory Mick Lynch had fitted up in his own home.

I might say here that I was always active on the side-lectures under Sinn Féin; for example, one listed for Dun Laoghaire Town Hall which, however, was banned by the authorities, and had to shift to a smaller hall. Fred Allen was in charge of that series which included Gavan Duffy, Eoin MacNeill, etc.

We used to raid quarries and get gelignite, detonators and so on. I knew people in the Longford Co. Council and, through them, we got supplies of electric detonators and gelignite. At that time we were relying solely on gelignite. It was always gelignite; there was no explosive manufactured at all in the beginning.

10A, Aungier St., a newsagent's shop run by a Frongoch man, and just opposite Whitefriars St. Church, was where we assembled and filled the earlier grenades. It was only assembly work until the earlier Mills bomb started, and then we filled it, but with gelignite still. We would fill a certain number and then each of us would go out carrying some of the grenades in special webbing bandoliers worn under our clothes round the waist.

My principal contacts were Michael Lynch, Mulcahy and the Ryan family. This would have started about Christmas 1917. Tom Dillon (now Emeritus Professor) was another contact, and with him, at Larkfield, Rory O'Connor and the Plunketts. He was a survival from 1916. He was really not in things at all, but he was working on explosives. What he wanted to get was a native supply of explosives. His approach was

theoretically sound, but very impracticable. For that purpose, he got hold of the idea of obtaining creosote from the gas works, distilling it to get cresylic acid and nitrating that. I was working with him on that. That gave us nitro-cresylic acids, chiefly di-nitro-cresylic acid, though the tri-nitro-acid would have been better. He was on to a good thing if we had a hundred chemists in a factory, but we had no chemists and we had no factory. We got some results from that in getting tri-nitro cresylic acid, but it needed a research chemist to produce it and there was not much hope of simplifying the process. I did the testing on that stuff, but we did not get very much further. Dillon was arrested about March 1918, in the German Plot period, and was in the batch brought to Gloucester. He left word with his brother that I was to clear the laboratory and remove all traces of our work. This included particularly the making of mercury fulminate and the adaptation of emptied caps from .22 ammunition for testing out various fulminate mixtures for use in detonators. That was getting on towards the end of the 1914-1918 War period.

Another thing I was put on was the making of poison-gas, tear-gas and things like that. I took it that we were going to use these gases, and I did not think very much of the possibilities, but I learned from Dick Mulcahy - I think he was in touch with Dr. W.D. O'Kelly - that what we were really working on was to take safeguards against poison-gas, the use of which, during the imminent imposition of conscription, was expected. It was presumed that gas was going to be used at some stage of the war here and that it would be of benefit to be forearmed. I was working with Dr. W.D. O'Kelly also on the making of helmets and goggles and masks which would absorb the poison gas, active charcoal being one of the filter

ingredients of the mask. I had to make the poison gases myself, and carried out all experiments connected therewith by myself. During one of these experiments it blew up and I got all the liquid gas on my face. I thought I was blinded, but, fortunately, after about fifteen or twenty minutes, I found I could open my eyes. My face was a mass of water blisters and I had to be off work for about a week. The liquid form of the gas was, of course, much more virulent and damaging than the gas itself which is what would be normally used in attack. I could thus lay claim to be the first poison-gas casualty in Ireland, if not the only one ever recorded.

I made two gases principally, which were based on materials obtainable from Nobel's. They were mono-bromo-methyl-ethyl-ketone and di-bromo-methyl-ethyl-ketone, both good lachrymators or tear gases. Professor Hugh Ryan knew from the signs of my equipment and materials (left about after I was disabled) that I was working on these gases, but he had to pretend he knew nothing about my work.

I got a suggestion then that put me on to a new type of explosive which seemed to have possibilities from the point of view of actual manufacture here, as the materials were common and easily procured. I was to work on these explosives until I could make their production simple. The whole problem with me, if I was going to produce explosives more or less on an army scale, was that they had to be made so simple that men with practically no technical knowledge could make them in a farmhouse kitchen and places like that. Yet, they had to be fairly foolproof, because we could not have people all over the country having their heads blown off. We had some accidents, but not many. Training was given and a series of instructions on explosives, incendiaries, etc. was gradually issued.

The first type was of the nitrated resin type, the principal ingredient of which was resin acted upon by nitric acid, gave an explosive material of the desired type. This I subsequently called war-flour. It was not a very simple process and, as all the nitric acid had to be washed away, there was always danger of traces left, which made the product not very stable and, as a result, a bit dangerous.

This work was done in the university laboratory. As a research student I used to work there until a late hour. To a certain extent, there was always an element of suspicion about my work, but this chance had to be often taken. For instance, at the time of the tear-gas incident, there was only one person in the building when the liquid blew up during my preparation of the poison gases. He was a laboratory superintendent, and when he found me wandering about in instinctive search of water after being blinded, he was free to think what he liked. I could not say whether he was friendly or otherwise, but even if he was not he would probably keep his mouth shut. Perry was his name, and he was the only person who actually saw me out of action. After the explosion, and when I had recovered my sight, he wanted me to go to Vincent's Hospital, but I could not go there as I would have been subjected to awkward questioning.

My chemical work was developing all the time, in accordance with the type of grenades that were being produced. Some of the people I contacted and worked with about this time included McGurk, Rory O'Connor, Dowling (engineer) and D. O'Brien (engineer). I had quite a lot to do with the designing of the original Mills-type grenade and the various modifications and improvements that were soon to follow. I remember being astounded at completing a design on paper

one week. the length of fuse, its distance into detonator, total length and other measurements accurate to 1/32nd of an inch, and seeing the following week the workmanlike finished article.

Consideration was also given to the possibility of infecting the horses in the various cavalry barracks with glanders or some similar infectious disease. Another aspect of bacteriological warfare was the possibility under consideration of spreading disease, e.g. botulism, on which I wrote a couple of articles about 1918. The whole thing arose out of the conscription scare because in the highest circles, even in the Castle, it was definitely expected that conscription would be applied here. It was the nearest miss that this country ever experienced.

As regards this infection, botulism, I don't know what the full application of it would have been. It was for human use, but what the proposed application of it was I cannot say. Its effects were only passing, resulting in dizziness, sickness and affecting the sight, etc. The above illustrates a couple of unusual possibilities that were considered from the military angle.

After the conscription time, about March 1918, would have been the critical period.

My contact with Peadar Clancy and Dick McKee automatically fell into the role of munitions, and that would have started about June or July 1920. What had been happening in the intervening months was that I quitted the theoretical stage. In April or May 1920, there was a considerable tightening of the ban on chemicals by getting supplies through the Apothecary's Hall and places of that sort and there was

evidence by that time how far such sources of supply could be used. In any case, the authorities were conscious that chemicals were being made into explosives , hence they tightened up on all the possible raw materials which became impossible to procure. This resulted in two things. One was that we had to have recourse to g elignite and things used in quarries which were raided in various places. This information could be obtained locally in every area. We were faced with the two possibilities - one was to get the finished product used by chemists in the way of explosives, and the other activity was to replace the small sources of chemicals on which we had relied previously and try to work up something on a big scale in the way of importing.

I was really responsible for everything in the way of explosives. In connection with g elignite, I tied up and co-ordinated much more closely what had been independently set up, munition shops, etc. I did everything in connection with timing fuses, trying to make detonators from the raw materials, but these were never 100%. I made the chemical mixture and then the munitions shop would seal off the copper tubing with solder, making a cylindrical receptacle. We had to make the bomb first and then insert the d etonator which had been filled with fulminate and chlorate mixture devised by me for making detonators. Co-ordination then developed very r apidly. The result was that I was much more in touch than anyone else with the actual munitions - in devising the various fuse conbinations methods of improvement, the devising of grenades and so forth, and I was able to get very quick results. I remember at one time getting a beautiful grenade turned out in a week - a vast improvement on anything that had been done before in the way of moulding the wall with its sectional grooves. I always maintained that our final grenade was really superior to the Mills.

The fragmentation, which measures the final hurting power, was a matter for frequent testing. A grenade that would split in two and ignore the grooving would obviously be virtually useless. In a lean-to corrugated iron shed at the "Bottle Tower", Churchtown, I carried out tests with Sean Russell by counting the fragments actually left behind plus those which had escaped making holes in the roof.

There were two things developed very rapidly at that stage round about the time that I was first meeting Clancy and McKee in the summer of 1920. I did a lot of the experimental stuff and the actual making of it in the university. As regards filling actual grenades from raided commercial explosives such as gelignite and working to a certain extent on fuses, etc., that was mostly done in 10A Aungier St. at the back of a newsagent's shop. This indicates one side of what was being developed as a result of the ban. On the other side I was getting closer with Liam Mellowes and others. I cannot remember very clearly how I started getting stuff from England. I know I was over in Liverpool about that time and contacted the Dalys (Knowsley Road). One of that family is a doctor in St. Bricin's Hospital. His sister, Una, did secretarial work for Liam Mellowes. I know that our object was to try to get supplies on a big scale. I am quite clear whom I contacted later, but at that stage I am not clear.

In the latter stages, pre-Truce, I got a lot of chemical raw materials through Francis Fitzgerald who owned a chemical factory in Greenwich. He was a brother of Desmond Fitzgerald. He was an extremely useful introduction. It took time to develop this source of supply because the quantities involved were very much bigger. We got the stuff consigned in new begs as bicarbonate of soda or any commercial material such as

baking soda, cream of tartar, etc., all of which resembled our raw material which was potassium chlorate. We could get over the basic raw material which I had adopted as being the most practical for our use. The problem facing the making of explosives in this country was that there were no industrial factories. There were no factories which we could turn over to the production of explosives. There was no skilled labour that knew anything about chemicals and there were no raw materials, so, for that purpose, one had to devise the simplest possible types of explosives and these were naturally of a low grade, i.e., we were turning out low grade explosives instead of high explosives. Subsequently, through the Fitzgerald connection, we were actually in a position to get near-high explosives such as dinitro-benzene and dinitro-toluene, and these, mixed with our neutral base of potassium chlorate, made for better and better explosives as time went on. In the early stage, people came forward to help in this matter, and one that I recall was a young Jesuit named Dowling, an engineer, with whom I had contact in connection with grenade designing.

In connection with attacks on barracks, etc., which were beginning to develop at this time, our activities were purely directed to the making of incendiary mixtures which gradually evolved to the making of incendiary grenades. I adapted a combination of the Mills type of bomb which we were about to bring out with incendiary materials and primers to produce am incendiary grenade, although the requirements for a fully explosive or a fully incendiary effect are quite different. In the explosive grenade, the object was to have a thick cast-iron wall serrated in such a way in the mould as to reduce by fragmentation to a theoretical 48 fragments upon explosion, each of which would be similar in effect in action to shrapnel;

whereas in the case of incendiary work, a soft and easily consumed wall was what was required, preferably itself made of inflammable material, which would be destroyed in the process, and the contents such as to produce intensely high temperatures in the least time. There would, of course, in an incendiary grenade, be no detonator tubes or detonating explosive, but the fuse, which would be ignited exactly in the same manner as the explosive grenade, would touch off an easily inflammable primary mixture which perhaps, even though a second primary or secondary mixture, would work up with rapidly increasing temperature the main body of inflammable material. The first type of such grenade, but in a more imperfect form, had actually been tried out by me in company with Mick Lynch before he had been replaced by Dick McKee. This had a lead wall and contained thermit as the main mixture, but the first efforts in that direction had not got over the difficulties of graduating the stages from the fuse to the main body of incendiary, with the result that there was a mildly explosive action which had the effect of scattering the main body instead of rapidly igniting it. By constant research on such practical problems, a stage was reached when these difficulties were resolved, and I remember the first official try-out of this product which took place in the basement of 44 Parnell Square in the presence of McKee, Clancy, Sean Russell, Mick Lynch, probably Sean Mooney (then brigade adjutant), and others. This was a memorable occasion, as units were drilling upstairs while we occupied the dark basement. In view of the job being undertaken, the drilling was an important adjunct as it tended to conceal the activity in the basement.

A manually ignited fuse was used on this occasion, not

one operated by a hammer and cap mechanism, as the purpose was simply to try out the actual incendiary materials in association with primers and the container. It was, as far as I remember, a cigar-lighter fuse, and its progress was visible in the dark, so that the excitement and tension grew as the flame visibly progressed. During the silence of waiting, the marching and drilling upstairs filled the expectant basement. It was a complete success in every way and McKee was highly excited and congratulated me, shaking both my hands.

When we had finished, the upstairs building began to fill with smoke, but by then we, the experimenters, were gone.

I have spoken on our earlier dependance on gelignite in the absence of our own manufactured explosives. Gelignite, however, requires careful keeping as, under frosty conditions, crystals of part of the ingredients separate out leaving the explosive in a very sensitive condition. On account of the increasing use of gelignite in the form of grenades and also land mines in many attacks on barracks, etc., several accidents occurred arising from bad storage. Special instructions were, therefore, issued as to the proper handling and storage of gelignite. As these instructions became known I was asked to write a series of articles on such matters in "An tOglach" which was then functioning. Two of these articles appeared in "An tOglach" in March 1920. Experimental work continued all the time and, as well as the accumulation of as many raw materials as possible, tests were carried out for me by the Meath Brigade. One of the sources of supply before we got on to really big direct imports was Maiben's, Westland Row, Laboratory Furnishers.

I cannot recollect at the moment at what stage a manufacturing workshop was introduced in the back premises,

but that date can be secured by reference to Jim Cotter or Joseph Tallon who were amongst the earliest assistants I had at this period. The latter was recommended to me from the 1st Battalion, Meath Brigade, by Sean Russell. The former was useful at carpentry work and designing, and between us we devised useful equipment for grinding and sifting the materials used. The primcipal explosive used at this time of our own make was the one from nitrated resin, already referred to, which I christened "War Flour" from its resemblance to Indian meal or coarse flour. I was working all the time towards a simpler explosive of the type already referred to as desirable, for which my model was cheddite and was christened by me "Irish Cheddar". It was not perfected for some time. A contemporary explosive, however, was of the ammonal type, based on amonium nitrate and aluminium nitrate "Ganainm", but the results were not sufficiently good to encourage its general adoption.

In November 1920, McKee and Clancy were killed and this threw many things back. I was immediately approached by the Director of Organisation, Diarmuid O'Hegarty. As I had already volunteered to help the successors of these men in any way I could, he came forward with the suggestion that I take over the official job - in charge of explosives, etc. I was under a contract with my employers at this time and they would not release me, so it was agreed with the Director of Organisation that I should do the best I could part-time for the time being. I should have said that Mulcahy immediately approved of the suggestion by the Director of Organisation about taking me on to Headquarters. The whole Headquarters staff was reorganised at this period, or, rather, for the first time properly constituted as a full Staff. Before, there were only some six members, but after this reorganisation, "Ginger"

O'Connell, Rory O'Connor, Sean Russell, Liam Mellowes and myself were added.

I shall have to try to fix a date for the establishing of what proved to be our principal workshop for some time in the basement of Peter Street Dispensary, where we worked in such a position that we could see through the windows the frequent comings and goings of troops and Tan lorries issuing from Ship St. Barracks. It was not very long before we achieved a degree of perfection in turning out Irish Cheddar which thenceforward became the most used explosive.

I could have mentioned many incendiary compositions of which, so far, only the thermite type has been referred to. There were also particular compositions made up for certain jobs; one of these that I remember was quantities of a solution of phosphorus in carbon bi-sulphide. This was packed in small bottles of grenade size, and was used in the attack on the L.M.S. premises on the North Wall, at that time an enemy outpost.

NOTE: If time permits, I intend to add a further instalment to bring this evidence down to 1921.

Signed: _____

Date: 13th December 1957

Witness: _____