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## EDITORIAL.

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Herein readers will find four articles of technical interest and educative value dealing with subjects connected with Police work, three of which were originally delivered as special lectures in the Police Training College, Vellore. Besides, there are three articles in lighter vein, one by a Deputy Superintendent of Police who prefers anonymity. The Editor thanks the contributors for the useful and interesting articles.

With the object of providing an incentive to police officers to contribute their best for the benefit of the Journal, which of course is for the benefit of the Force, a proposal is afoot to conduct an Annual Essay Competition on professional police subjects and award a Gold Medal to the best contribution.

July 1953 issue of the Journal will contain the remaining five valuable lectures delivered in 1953 at the Police Training College by Senior Officers to Cadets under training.

18-3-1953.

M. BALAKRISHNA MENON,  
Editor - Principal,  
P. T. C., Vellore.



## POLICE DUTIES AND FIRES.

BY SRI A. N. RAI, B.A., I.P., D. S. POLICE, TANJORE.

I propose to deal with one of the most important duties which you, as Police Officers, may be called upon to perform, namely, control of fires. It must be within your experience that an out-break of fire due to a small accident or neglect often spreads to a large area and results in considerable loss to life and property. High winds will help the spread of fire and unless timely and quick steps are taken it might turn out to be a major calamity. Being officers entrusted with the task of the preservation of human life and property it is necessary that Police Officers should be well informed about their duties and responsibilities on such occasions.

Fires are usually caused (i) by accident; (ii) neglect; and (iii) Incendiarism. The duties of a Police Officer in the first two cases are mainly by way of preventing the spread of fire and of rescuing life and property from the conflagration. In this the Police Officer has the advantage of working along with the personnel of the Fire Service Organisation. In the third case the Police Officer has to bring to bear upon his task a considerable amount of alertness, imagination and scientific investigation. Of all the offences which a Police Officer has to investigate, offences due to incendiarism (arson as it is called) demand the maximum care and attention. In our country particularly village factions will readily take advantage of the situation and try to rope in innocent persons. It is here that you as Police Officers should use your judgment and arrive at the correct conclusion.

We are now concerned principally with the duties and obligations of the Police in an out-break of fire. As you may know we have not got a special Fire Service Organisation with modern equipment and trained personnel in almost all the Municipal towns. The progress in the fire fighting equipment from the days of the archaic syringe to the modern motorfire engine is very interesting. In Madras as early as 1890

four steam fire engines were stationed in four different parts of the city. In 1914 motor engines replaced the steam engines. It was only in 1934 that the first modern type of fire engine was introduced. When the second World War broke out, and there were threats of air raids, a separate service known as the Madras Fire Service was constituted as part and parcel of the Civil Defence Service. In November 1942 the service was separated from the A.R.P. and was placed under a Director of Fire Services. What was intended as a war-time measure, ultimately, on the termination of the war, was retained as a peace time organisation. In 1949 the Madras Fire Service was integrated with the Police Department under the administrative control of the Inspector-General of Police. With the establishment of the Madras Fire Service we have now amongst us a large number of expert and trained fire-fighters who are always available for dealing with fires.

Broadly speaking fires can be classified into (i) carbonitive fires which leave carbon behind. Fires in dwelling houses, stores, hayricks, etc., may come under this head. These can be ordinarily put out with water. (ii) Oil and spirit fires in which it is the emanating vapours that burn. Water should on no account be poured in such cases as it will only spread the fire. In such instances application of carbon-dioxide and the use of carbon tetra-chloride in other than confined places will be effective. In cases of small fires, however, water can be used by a special instrument called fog-nozzle. (iii) Electrical fires where it is not possible to switch off the current. Even here water should not be used as it is a good conductor of electricity. Carbon-dioxide and carbon tetra-chloride should be used.

I shall now tell you what a Police Officer has to do on receipt of information about an out-break of fire.

Being local officers with an intimate knowledge of the locality, you must know the location of the nearest fire hydrant or water source. In urban areas a list of fire hydrants can be found at the Police Stations. Fire Engines will have to be directed to them by you

with the least possible delay. Besides this you may be called upon to render assistance to the fire brigade in many ways like conveying messages by the Chief Officer for additional help, prevent the well meaning help of amateur fire fighters which might result in confusion rather than in effective work, keep the public well clear of the fire fighting apparatus, render first aid to the injured and so on.

As soon as a Police Officer hears of a fire he should immediately intimate the nearest fire station and if he is not in his station also the nearest Police Station. In intimating the fire station utmost care should be taken by a police officer in giving the information. The information should be correct and clear. It should specify the exact locality and also the nature and magnitude of the fire. This will enable the fire brigade to locate the place without any delay and also to bring the necessary equipment. A mistake committed in regard to the exact locality of the fire might lead to the fire brigade wasting its time when time is the essence in such cases-in going from place to place. It may well be that on account of such mistake fire brigade might reach the scene a day after the fact.

Detailed instructions on the steps to be taken by a Police Officer on receipt of information of a fire have been incorporated in the Police Standing Orders (O. 402A). Among these the following points may be mentioned :

On receipt of information the senior Police Officer present at the Station should :

- (i) immediately send information by the quickest available means to the nearest Fire Station ;
- (ii) requisition medical assistance and ambulance, in necessary ;
- (iii) inform his next superior officer and Sergeant Major of the Armed Reserve if the fire is at the Headquarters and call out all the available police officers for duty at the scene;

- (iv) send to the scene all available fire hooks, buckets in places where there is no Fire Service ;
- (v) report to the S. D. O. or the D. S. P. important fires in which there is loss of human life.

Having informed the fire station you should also post some guides at street points so that they may direct the fireman to the scene without delay. As time is very vital factor on such occasion you should take all necessary precautions to save time. You should immediately rush to the scene. All Police Officers in the vicinity whether on duty or otherwise should be called up and deputed for the work. It should never be thought that when a fire fighting unit is at work the policemen can go home. The duty of police officer continues even after the actual fire is put out. It should be distinctly understood that the actual work of putting out the fire is entirely in the hands of the Fire Service Personnel. The police are there to assist them and render all possible help that is necessary. It is usual especially in towns for large crowds of people crowding at the scene to witness the incident. Sometimes the crowd might swell to thousands. It is here that the police officers' services are essential. The police should clear the crowd and cordon off the locality and crowds should be persuaded to disperse as they will hinder fire fighting. The police should also see that all valuable properties salvaged from the fire are kept under proper guard. Great care must be taken to see that in the panic and confusion properties are not carried away by any member of the public. Policemen are primarily responsible for maintaining law and order on the occasion. Traffic near the scene of fire will have to be suitably regulated. No vehicle should be allowed to be parked so as to obstruct access to fire hydrants or water sources. Fire engines should be given top priority in vehicular movement and roads should be kept clear for their movements.

As soon as the Fire-brigade arrives they should be allowed to assume charge of the situation and the police will have to render all

necessary assistance to them. They will on no account take any part in the actual fire fighting unless called upon to do so by the fire service officer in charge.

Most of you may be posted to stations with in whose limits there are no fire service stations. The Government have directed that normally fire appliances should be sent upto 30 miles from their Headquarters to attend to fire calls and that in exceptional cases they may at the discretion of the fire officers be sent to places beyond. The officer should consider whether having regard to the distance at which the nearest fire station is located it can render timely and effective aid and whether the fire is likely to be serious enough to justify a long journey by the fire service vehicles. In some cases the places may be so far away from a fire station, that it may not be practicable to requisition the services of the fire service personnel. It is in such cases that duties of a police officer will be more onerous and exacting. He has got to assume the dual roll of a fire officer and a police officer. On receipt of information in such places the police officer should proceed to the place expeditiously with all the men and equipment available and after making all the arrangements for controlling the crowd etc. as mentioned above, proceed to put down the fire. All the inflammable materials near the scene should be removed forthwith to places of safety. If the building or premises on fire is electrified the current will have to be cut off immediately. You will have to assure yourself that no person has been caught in the premises on fire and if there is a doubt a most deligent search should be made behind doors under windows, under beds and in all places where a person might have gone in search of fresh air within the house. Do not break open the doors and windows indiscriminately. If you enter the house take care to close the door behind you as draughts of wind will only help to aggravate the fire. If there is too much smoke in the room, one or two windows may be kept open for a short while. Fire normally burns upwards and so the searching should always commence from



the top of the building. If it is made from the bottom the chances are that the fire would have preceded you before you reach the top and render the search for the victims impossible. It might also put you in grave personal danger. If the stair case is on fire and impossible, you should try to get the occupants to a window and to get them down by a ladder. In rescuing the victims women and children and invalids should be given preference and helped out first. The possibility of cattle perishing in the fire should be examined and for this end cattle sheds and places usually intended for keeping the cattle should be examined. The cattle found in such places should be led out to places of safety. In a place full of smoke you should crawl on hands and knees keeping as near the floor as possible. This will help you to breathe the pure air and also to feel with your hands if any object or obstruction is likely to hinder your work. If the fire is in a locked up shop or warehouse or stores do not break open the doors and windows indiscriminately but use your discretion and act intelligently. In an enclosed premises there may be difficulty in opening the door and care will have to be taken to see that you are not overcome by the escape of hot air. First aid should be rendered to the injured and they should be removed to the nearest hospital for further treatment.

I would like to reiterate that a police officer should exercise considerable judgment and skill in cases of incendiarism. Many of you will be spread over the rural parts of our State and you may take it that in most of these areas faction will exist. Each of the opposing groups will be plotting against the other. It may happen that in some cases the more imaginative of the lot might set fire to a dwelling and set the law in motion against his opponent. It is not unusual that on such occasions, the name or names of the suspect will be readily forthcoming whereas in ordinary cases practically no clue will be available. I would like to impress upon you the need for great care and judgment in such cases. Use your knowledge of men and things and act justly. Do not be carried away by one sided reports. In cases

of ordinary arson, as soon as you reach the place take steps to prevent people crowding about the area for it may well be that a clue to the crime might be afforded by the footprints that are found on the scene.

The law affords protection to Police Officers causing damage or obstruction in good faith and in their discharge of their duties as Police Officers in putting down the fires. Any police officer above the rank of a constable may, on the occasion of fire :

- (i) remove or order the removal of persons who by their presence interfere with or impede the operations for extinguishing the fire or for saving life or property and close any street or passage in or near which any fire is burning.
- (ii) by himself or through those acting under his orders, break into or through or pull down or use for the passage of hoses or other appliances, any premises for the purpose of extinguishing the fire. It should however be remembered that in doing so the police officer should do as little damage as possible and the circumstances warrant ;
- (iii) cause the mains or pipes in any area to be shut off so as to give greater pressure of water for drawing the water from the water sources ; and
- (iv) take such measures as may appear necessary for the prevention of life and property.

I have so far dealt with fires which are promptly reported by the public or which come to the notice of Police Officers. There may be cases where either because of lack of adequate facilities for communication or other causes, an outbreak of fire may not come to the notice of the Police at all. In rural areas, for instance, a number of fires causing immense loss to property, food-grains and cattle occur and in many cases they are not reported. To circumvent this, it is

essential to take preventive measures to reduce or minimise outbreaks of fires and the consequent loss of life and property. In some interior villages, even to-day villagers are not in the know of the existence of fire stations, their functions and utility. It has therefore become necessary to educate people living in rural areas regarding the usefulness and the existence of fire stations. In the beginning of 1951 instructions were given to the Police of all districts in the state to organise in every parent village, fire squads on a voluntary basis. The personnel of these squads should be young and able-bodied and must possess good antecedents. They are generally known as the village fire watching and fire fighting squads and one of their important duties is to keep vigilance against the occurrence of fires and take all measures to extinguish such fires as promptly and speedily as possible. In most of the important villages, the fire-watching and fire-fighting squads are in existence. The co-operation of the public in such cases depends mainly on the relationship between the Police and the public. Without the goodwill and the co-operation of the people you may be rest assured you will not at any stage of your service be able to achieve much. I therefore need hardly impress upon you that in this, as in every sphere of your other work, you must secure the largest volume of public co-operation. In another few months you will have completed your training here and when you get back to your districts to learn practical police work it will be well worth your while to go through carefully the instructions issued from time to time on the organisation of village fire watching and fire fighting squads, fire precautions and measures to be adopted in the event of fire.

Lastly I would ask you to bear in mind what I have told you and act accordingly in handling outbreaks of fire. You should act quickly, think intelligently and conduct yourself in a manner that will bring credit to the Department to which you have the privilege to belong.

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## K I S M E T.

BY EX.—SAP.

Kismet. Many an error of judgment, many a foolhardy venture if it lands one into trouble, it just is Kismet. I don't know but one has few things to dwell on when the end of life's journey is near at hand, all because of Kismet. How else could one explain.

It started as a bet in a canteen at Madras. Some one said that it would be impossible for a lonemotor cyclist to go from Coimbatore to go on the coastal route, what with rivers and coconut trees. Yes said another, monkeys may shy a few at the feller on the phut, phut! What with one thing and another, some one 'dared' me like an impudent school-girl and I took up the challenge. Wagers were laid and by the week end I was hustled out of Madras in the early grey hours. And six days later, after many a puncture and sordid hotel I was still chugging through the country of the coconuts. The dust was terrible and the cows and buffaloes! They took great delight in making me ride faster for which additional pleasure, I paid by not being able to sit at all!

Some 10 miles from an unpronounceable town, I came to an ancient sign post. It was just four in the evening and the coconut fronds rustled and shone like rapiers in a fencing school. It was hot, I needed a rest as did my engine. The sign post said that  $1\frac{1}{2}$  miles away was a church and I could see the cross on the spire just above a hillock. A church in these parts meant, a good natured father in a comfortable house and who knows, a good cook as well, and an invitation to stay! So I turned right and climbed the hill through an ancient lane. At the top, I looked back and saw the sea in the setting sun. In front, my shadow sped and touched the walls of an old church a furlong away. I sat there and watched as the sun went lower and the sea turned red. The church grew whiter and the hills became blue. The land turned mellow and inviting. No village was to be seen and the dusk of the evening brought peace to my soul.

At the steps of the church knelt an elderly villager head bowed in meditation, his skull cap in his hand. A patched black coat and a faded dhoti tucked upto the waist was all that he wore. His grey mustaches wobbled as he said his prayers. My noisy arrival bothered him not and only after his prayers were done, did he look up at me, while crossing himself.

I asked him if there was a padre about and he pointed out a small cottage almost hidden by wild bushes at the far end. At the back of the church lay a small adobe which said old Pedro was his. He was a good chap, this Pedro, and I too sat on the steps listening to the history of the church. About the Portuguese who built it and the wealth they kept here. Of the infamous attack on it by a lieutenant of Tippu and the massacre of the padres. So on it went, till the lonely hills disappeared with the setting sun and in their place gaunt formidable dark protuberances dominated the place. The moon grew brighter and the light was eerie. In that vast silent world, Pedro and I felt ourselves to be no taller than a sparrow. I thought of food and rest and we got up and went towards the padre's house.

It was dark and the long gothic windows seemed to express displeasure at our intrusion. As we walked up the drive, there was a rustle from the bushes and a tall padre came out to greet us.

"You have a visitor, father", said Pedro and the Padre looked at me and said "Yes, my son."

He was a foreigner, with the long face so common to us students of history. A Spaniard or Portuguese I thought. He looked at me steadily from his six feet, three or so, for a moment, and then over my head at the brilliant moon shining above the rain trees in a clear sky. I could see the whiteness of the skin over his Adams apple, as he gazed at the moon.

"Pedro Pedro" the Father shouted in a hoarse tone of despair, "it is the full moon tonight."

Pedro took one look at it and grabbing my hand rushed me out of the place, all the time saying "Father, I forgot; Father I forgot".

We were heading for his hut at a sharp clip and I was unable to understand the antics of these old men. Even the church had a sinister appearance, and my heart beat a little faster in tune to my steps. A little quines of fear passed from Pedro to me. A dog from somewhere howled long and miserably at the moon. My scalp tingled. "My God, too late, too late" panted Pedro, as a tremendous gun shot tore the silence to pieces. My heart stopped. The cry of the dog was silenced for ever. With leaden feet, Pedro and I flung ourselves into his hut and closed the door and latched it.

A square patch of the pale blue moon light was visible from the solitary window. A religious calender with todays date stared mournfully at us from the blank white wall - A table with kerosene lamp and a chair drawn up were all that adorned the room. Pedro huddled close to the door keeping the table in between himself and the window- I tried to question him but his clammy hand came out of the darkness and pressed my lips. It is the full moon, he whispered, it affects him like that, and glared me into silence. I knew then what mortal fear was, sitting in the silence and waiting for God knows what. The chill of the night crept up my bones and my heart lay trapped in my throat.

In the silence, came a steady crunch of some one walking on the gravel outside. A wooden butt rested on the door and tested it with a push. The doors held and the foot-steps rounded the corner. One more turning and the thing would be at the window. Fear gripped me as never before and I wished to run and throw myself outside the window and come to grips with the Thing stalking there. The footsteps stopped as did my heart. The night was shattered with the noise of another gun shot just outside and the broken tiles dropped on us exposing the blue sky above. A splinter cut me across the mouth and the salty blood was refreshing to the taste.

The steps walked on and came steadily towards the window. Pedro sat hunched by my side his flowing mustache drooping. I stared at the opening above me and then at the window, helplessly at the mercy of the Thing outside. Then slowly the barrel of a gun came to review the interior. I do not know if it fired or not, but the lantern exploded to pieces and fell on Pedro. I looked at him as he lay there with half his face blown away and the dark blood dripping from his moustaches. I wished to get up and run but my feet would not move. I longed to cry out but my tongue lay stuck in my mouth. My mind flew here and there and voiced its agony like a newly caged bird unused to captivity.

Alas, Alas, cried my mind, this is Kismet. I turned to Pedro and horror of horrors, no body was to be seen where Pedro had seen slaughtered two minutes ago. The calender on the wall fluttered and lo! it showed some date in the 18th century! Was it a dream, then this evening adventure of mine? I was saved! I was the victim of a ghastly joke of two elderly ghosts! I turned to the window and found an answer. The barrel of the gun pointed at my head. Behind it, ominous, stood a figure in white, whose head and shoulders I could not see. Inexorable, I thought, and waited for the crash.....

Some little voice within me in all this turmult cried, Kismet, Kismet!

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## A SOLILOQUY :—

BY SRI P. K. PATTABHI RAMAN, B.A., A. L. I. P. T. C., VELLORE.

What a strange life ? A Policeman touches the lives of the people at so many points and yet he can never be completely one with them. People talk a great deal about the cordial relations between the Police and the Public without realising the barrier between them. The Policeman is the public conscience and is a perpetual reminder to the man in the street regarding the things he must not do. How can he expect any man to regard him with real affection when at any time he may lay his arm of law on his shoulder ? Denied of opportunities, the Policeman must have all the virtues ; aware of all the temptations, he must eschew all his chances ; and work he must with dignity and restraint, with everlasting patience and abounding energy, conscientious at all times and supremely courageous on occasion. And he must be all these things in the certain knowledge that, however popular as a man, as a Policeman he is regarded as a necessary evil !

Is not a Policeman as indispensable as the doctor, the teacher and the sanitary inspector ? Is it possible to value his work in terms of Rs. As. Ps. ? Will it not amount to putting a price on human grief and suffering and will not posterity have to pay dearly for the paucity of number and meagreness of pay of the Policemen ? The doctrinaire, the dogmatist and the amateur economist might be tempted to say that policemen are unnecessary and unproductive. But make no mistake about it - the policeman is, in a wider sense, very much a productive unit, mark these words. A Policeman may be standing at the corner with nothing to do, but he is not just a debit entry in the community's ledger ; he is one of the imponderables on the credit side. He produces nothing that can be put in a catalogue, but his presence in the public eye stands for a goodwill and an assurance of security that are not achieved by balancing books.



How slow is authority to realise this simple fact ; for thirty years a Policeman must resign himself to labouring at his task with the certain knowledge that the greater part of his labours will be effected when the rest of the world is relaxing or sleeping. this resulting in the inevitable weakening of social contacts and interests and slavery to time. This sacrifice means much to him, but how much more does it mean to his family ! Irksome hours of duty, strict code of discipline, forsaking of any other paid employment forty-eight hour week in the minimum, and in many respects the unpaid services of a wife at home for good measure ! I am not primarily interested in the prospect of a pension in 30 years, promotion, free uniform, free medical treatment and other items often mentioned so temptingly. The immediate and all important question is - How much do I get - now ? Colloquially speaking the answer is the milk in the cocoanut " !

"As I went through the suburban street and saw the lights in the upper windows go out, one after another, I pictured the inmates, men with regular jobs, eight in the morning to five at night, clerks, shop assistants, engineers, labourers, motor drivers ; all knew what they had to do, got on with it and at the end of the day had accomplished something and were finished, while a detective even after fourteen hours a day had nothing to show for all the hard work."

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## THE LABORATORY AND THE POLICE OFFICER.

BY N PITCHANDI, M. SC., A. I. I. SC., A. R. I. C.

With the advancement of Science, its applications to police work have also increased in a great measure in recent years. The laboratory is becoming more and more useful in the detection of crime. The laboratory helps to provide not only corroborative evidence but can also aid in the initial stages of investigation.

The main object of the laboratory study of materials submitted by an investigating officer is to connect a suspect or the vehicle or implements in his possession with the scene of crime or the line of approach to or departure from the scene. The laboratory may help not only to complete a chain of evidence against a suspect or prove that his story is false but also serve to clear him of suspicion if he is innocent. A few cases of interest from England and from our State have been quoted below from an article by the head of the Metropolitan Police Laboratory at New Scotland Yard and from the Madras Chemical Examiner's annual reports to illustrate the various ways in which the laboratory could help in crime detection.

1. On the outskirts of a small town, in Britain, a young married woman was returning home one dark night when she was accosted by a soldier but ignored him and went on. Immediately afterwards she heard the foot steps of someone coming up behind her felt an arm thrown roughly round her neck from the back, and received two violent blows, one on the head and one on the shoulder blade. She struck out with a torch she was carrying and heard it hit something metallic which, she thought was a button or belt buckle. This had the effect of preventing further molestation and she hurried home, where it was found that she had been stabbed on the head and in the back. Medical help was summoned and the police were notified. Beyond the town was an anti-aircraft gun site, and, since a soldier

was implicated and since the route to the gun site was that also leading to the girl's home, a check was made on the troops who had been out on short passes that night. It was noticed that one of the men interviewed had several dark and sticky stains, resembling blood, on his clothing, and as his explanation of these was unsatisfactory he was detained. The following morning the scene of the assault was searched, and a small saw-edged knife with a broken blade was recovered. The fragment of blade was also found, and the two parts fitted together accurately and were clearly parts of the same knife. The exhibits submitted to the laboratory were the injured girl's outdoor coat (a greenish rough tweed), her pink rayon blouse, her torch, the soldier's battledress tunic and trousers, and the two parts of the broken knife. There was an obvious stab-cut through the coat and blouse in the region of the right shoulder blade, both of which were bloodstained. The blood, when grouped, proved to belong to Group AB. The stains on the soldier's uniform were due to human blood also belonging to the same group, and were of recent origin. Detailed examination of the knife showed that the tip was bloodstained on both sides, and that the blood was human and belonged to Group AB. The examination of the knife also revealed the presence of a considerable number of fibres caught up in the serrations of the blade. The majority of these were wool fibres of various shades of yellow and brown, with occasional red ones, and could be matched exactly with control fibres taken from the uniform of the suspect. Near the tip of the blade there were, in addition, wool fibres showing detailed agreement with those of the injured girl's coat, and pink viscose fibres matching those of her blouse. It was a reasonable inference from these findings that the knife was the weapon used, and that it had been in the possession of a soldier. Attention was next directed to the suspect's uniform, and on the left sleeve further wool fibres matching those of the girl's coat were found, together with two human head hairs showing detailed agreement with those of the girl. Hence then was a soldier suspect, who had stained human blood of the same group as that of the injured

person on his clothing, with other indications of contact, and who in all probability travelled back to camp along the route taken by her.

A final point which emerged from the laboratory end of the investigation concerned the torch. This showed a linear dent in the nickel casing, and traces of nickel were found along the fracture of that part the knife blade which was still attached to the handle. It seems highly probable that when the injured girl struck out with her torch, it hit the knife blade and fractured it, and that the knife was knocked out of the soldier's hand by a second blow which resulted in the transfer of metal from the torch to the fractured end of the blade. The soldier was charged, tried, found guilty and sentenced to imprisonment.

The case described below is of some interest in that laboratory examination served to connect two apparently unrelated offences. A saloon car was stolen from a garage in a South Wales town during the hours of darkness. Its loss was discovered almost immediately, and was reported to the police, who circulated its make, colour, registration number, and other relevant details. It was recovered the same night with an empty petrol tank, on the outskirts of the town, and was dusted for fingers-prints with negative results. The officer investigating the theft noticed, however, that there was an appreciable quantity of saw-dust on the carpets covering the floor of the car. This was collected, and when examined at the laboratory proved to be that of Scots Pine, probably the commonest and most abundant kind of sawdust in Great Britain. Its evidential value, taken alone, was therefore poor. There were, however, among the wood fragments, numerous small thin, irregular flakes of brown vegetable matter, which bore a superficial resemblance to broken bits of cigar leaf but which on detailed examination proved to consist of particles of the skin of new potatoes. Further police investigation led to the arrest of two youths, and pine sawdust with the same unusual extraneous

plant tissue was recovered from their footwear and trouser turn-ups. This, with other information gathered by the police served to connect them beyond reasonable doubt with the theft of the car.

In the meantime a report was received that a Co-operative shop had been broken into and various articles and cash from the till had been stolen. The floor of the shop was covered with sawdust, which proved to be pine sawdust and contained particles of new potato skin derived from a large serving bin into which the sacks of potatoes were emptied. The accused were, on this evidence, charged with both the shopbreaking and the theft of the car : they pleaded guilty.

3. Some thieves entered a house in Madras one night, beat the inmates with sticks and stole properties worth about Rs. 5000/-. In this case a shirt of one of the accused with paint marks on it was sent with scrapings of paint from four boxes for comparison by the Chemical Examiner. The stains on the shirt were found to be similar in composition to one of the four samples of scrapings of paint sent.

4. A woman was alleged to have been robbed of her gold chains from her neck by three unknown persons. The offenders were reported to have gagged her mouth with a piece of cloth. During the investigation by the police another piece of cloth was recovered from the cradle of the woman's child in the house. This piece of cloth was sent for comparison with the cloth used for gagging since the police suspected the genuineness of the alleged robbery. The Chemical Examiner found that the two pieces of cloth appear to have formed parts of one and the same cloth.

5. Laboratory examination helped in the following case to decide a case of drowning. A body was found floating in the Coovm river. The *post mortem* examination did not reveal any sign of violence or drowning. The viscera were examined but no poison was detected in them. The examination of the stomach contents however revealed diatoms similar to those found in the blackish waters of the

Coom. Examination of the mud sticking to the body of the deceased also revealed similar diatoms. It was therefore a case of drowning. As is well known the waters of the Coom are not ordinarily drinkable.

6. In a case of housebreaking a crowbar which was suspected to have been used in breaking open a brass lock was sent for examination together with the lock. The articles were examined in the Chemical Examiner's laboratory and the colour of the particles adhering to the crowbar was found to be yellow similar to the colour of the yellow metal part of the lock. The yellow metal part of the lock was examined and copper and zinc (the components of brass) were detected in it. Traces of copper but not zinc were detected on the yellow shining particles adhering to the crowbar. The non-detection of zinc in the yellow particles on the crowbar may be due to the low percentage of zinc in brass and also to the extremely small quantity of the yellow particles present on the crowbar. So the crowbar could have been used to break open the lock.

The main Laboratory which is helping the police in crime detection is the Chemical Examiner's laboratory. I have already dealt with the various branches of science which help in the detection of crime, their resources and limitations in my previous lectures. In the Chemical Examiner's laboratory articles for poison in cases of suspicious deaths are examined in the poison section. Medical officers who do the post-mortem forward specimens of stomach, intestine, liver, kidney the urine etc., to the Chemical Examiner. These are examined on a requisition from a gazetted Police officer or a Magistrate and a report sent by the Chemical Examiner. In the blood section, the Chemical examiner reports in which of the articles sent to him blood is detected and portions where blood has been detected are sent to the Serologist who reports about the origin of blood whether from man, sheep or fowl etc. Articles containing suspected semen stains are also examined by him. There are other miscellaneous examinations done by the

Chemical Examiner such as of Fire Arms, Bones and tissues for powder and lead in shooting cases copper wires in cases of theft of wires bicycles etc., for restoration of filed off numbers, seals hair and other fibres.

Documents for handwriting identification, alterations, erasures, typewriting etc are examined by the State Examiner of Questioned Documents. There are also the Coin and Currency Expert and the Foot Print Expert attached to the C. I. D.

These are the laboratory facilities available at present to the Police of our State. It is hoped in course of time that these facilities will be increased and the investigating officers given modern scientific assistance not only to be used as evidence in courts of law but also to help them in earlier stages of investigation.

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## THE CRIMINAL AND PUNISHMENT.

BY SRI D. SUBBA RAO, B.A., DEPUTY SUPERINTENDENT,  
GOVT. RY. POLICE.

We are dealing here with the professional criminal and not with the opportunist. General precautionary measures are quite adequate to deal with the latter. But, with the former, special steps have to be taken to make him less dangerous to society by reforming and returning him to it if possible, as a useful and desirable member of the society. The criminal law of every country penalises crime and punishes the criminal for the wrong done to society. While the mode of punishment prescribed under law may be different from country to country, the aim of punishment everywhere is to reform the criminal. It is therefore said that the society gets the criminal it deserves.

Before we begin to deal with the criminal, the question as to what constitutes crime is germane for our consideration. The term "crime" has been defined and described variously. It therefore behoved us to turn atleast to some of these definitions. Crime is said to be a social disease in the body politic and the criminal, its manifestation. It is only from moral degeneracy that a person becomes a criminal. Elsewhere crime is stated to be a phenomenon of complex origin and that it is the result of biological, physical and social condition and that it represents man struggling against the factors which support order and the progress of society. Criminal pre-disposition overlaps degenerative disposition in an individual and these two vary only in degree and manifestation. Still, some authorities hold that crime is nothing but a manifestation of the contempt of the individual for the majesty of law. Recent reasearch tends to show that the ties which bind us to society grow from the christening of family affection beginning with the mother-child relation; and this in its turn may be stunted and thwarted at a very early age by prolonged separation from or inadequate care of parents. There is no doubt that the absence of



affectionate and secure home life is the main cause of delinquency and crime. Perhaps we shall learn to say that criminals are formed in the maternity-ward. Law breaking is but an aspect of anti-social behaviour which failing to respect the needs of other people, spreads loss and suffering over a far wider area than the law could ever protect.

A nation's criminality is influenced by many things, viz, by the efficiency of its justice and its Police, the extent to which its laws are in tune with the general standard of morals, the traditions of the people in such matters as carrying of Vendatta and such social matters as housing, cracity or abundance of consumer's goods, education, alcoholism, unemployment, habits of insurance the use of motor cars. All these, in a greater or lesser degree go to make up the "Weather" in which offenders grow or dwindle.

It is common knowledge that the risk of crime being detected is remote, that of getting a conviction is generally more remote and serving out the sentence is still more remote. Following the judgment in a lower court, there is always a chance of reversal by a higher court and subsequent acquittal at a new trial. There is also for the criminal, a further hope that executive clemency will reduce or modify the sentence. Finally, when the worst comes to worst, offenders living in large cities and urban areas where they are not widely known or being more free from Police surveillance, can always find it possible under the protection of assumed names could feel safe from molestation.

In the present penal system obtaining in our country, where fixed terms of imprisonment is the order, the prisoner awaits the termination of his sentence, and once again becomes active and carries on his nefarious trade, having been freed from the prison. Therefore, the law of the land must be adequate enough to provide the required protection to society from the professional criminal. It has also to

provide modern methods of adequate treatment of which many professional criminals sorely stand in need of

The first rights of a citizen of a State that has to be guaranteed are his physical safety, freedom of action within legal limits and the enjoyment of his lawful property. In this lies the first duty of the State. The State has to fight the criminal, the enemy of society. But to fight with any hope, we must know the enemy. Hence, any manifestation of contempt for law should be checked in time. To instruct the ignorant criminal, to reform the incorrigible and to prevent the incurable from offending, are some of the duties which the State must fulfil with loyalty and zeal.

No doubt, the entire world affords a continual spectacle of injustice and life is never free from afflicting situations. We know that nature is prodigal with one and niggardly with another. In one climate a man freezes and in another he burns. Thus, nature abhors equality. It is therefore not easy to expect equality in society. Human justice cannot do therefore otherwise than imitate the justice in nature. Still, as people living in organized society and endowed with the highest faculties of head and heart, it is up to us to give our best to the fallen man and lift him up employing all means to reform him and thus make him a desirable member of the human family. After all, the criminal to be reformed does not come down from the clouds as an enigma to be solved. We know his antecedents and have direct means of observing him. This knowledge of the criminal should be employed as a means of rendering him less dangerous to society.

The majority of individuals comprising the society are not at all criminals. It is only a minority amongst them that take to crime both as a career as well as by force of habit. That there should be this difference between one person and another, surely, cannot be without there being some cause or causes producing this difference. It is with these causes that the law enforcing agency has to deal with

and mould the behaviour of the criminals for the good of the community.

Punishment ought to represent a means calculated to effect a cessation of the criminal's harmfulness to society. It should interpose to the criminals activities a barrier of sufficient strength to nullify that activity. Aspects such as the proportionately of the punishment and the objective gravity of the offences or the moral responsibility of the offender must be decided before the punishment is inflicted on an offender. Punishment must not be adopted and confined simply and only to the criminal aptitude of the wrong doer as an individual.

The popular idea prevailing that punishment is a suitable substitute for private vengeance should be banished from our minds. It is idle to try to measure punishment by the harm done to the society by a criminal. It easily took us two centuries to realize that the criminal and not the crime should be the object of investigation and study. The treatment aimed at should therefore be for the curing of the individual and at eliminating the causes of his anti-social behaviour. So our efforts are to be directed not to the measuring for the quantum of harm to be inflicted on the criminal, but determine the kind of restrain best fitted for a particular criminal.

Criminal law is one thing and the measures necessary against malifactors is another. It is a hard reality that thousands of professional criminals ply their calling in spite of the exertions of the Police. From the material point of view, it seems that the trade of a criminal presents many advantages over most honest callings. It is attended by almost no danger and gets for the minimum of work considerable financial returns which are all the more significant if we remember how difficult it is for an honest work man at any time to command a sum in excess of his daily wages. Punishment instead of instilling fear in the mind of the wrong doer has merely conventional value and has practically no effect whatsoever in the case of

professional criminals. It is queer that in some cases punishment represents a positive advantage to the criminal who is lodged, fed and clothed at the expenses of the tax-payer. The criminal has paid nothing for his sins while the public defray the expenses of the criminals's maintenance and indirectly the damage suffered by the society at his hands is increased instead. A prison therefore cannot work wonders and the criminals has rarely undergoes any reformation and the liberated person comes out of the prison the same man who went in extreme criminals who are wholly destitute of moral sense are not greatly impressed by the menace of imprisonment whether for years or for life. They are too improvident, too brutalized and too littly sensibility to appreciate the degradation of jail and jail life or to feel for what the loss of their liberty entails. How best therefore to reform such a criminal is engaging to-day the best attention of criminologist all over. To ignore misbehaviour of a criminal is short-sighted and foolish, but to regard punishment as *Sine Quo none* of treatment is hardly enlightened or mature.

A mechanical cumulative sentences of a short or a medium duration spread over years and applied according to the gravity of the offence and ignoring the personality of the offender, I think, is of no practical use whatsoever. Clapping of a criminal in prison for the orthodox prescribed period and then giving him his liberty with no better equipment of becoming a desirable member of Society is again of no consequence. We have to seek new ways and methods of approaching this question.

Criminal science had advanced so far to-day that it has become possible as a result of investigation carried out, to conclude that there is a close association between poverty, mental abnormality and criminal propensities. Offenders against property represent more than three quarters of the mass of recidivists. It is also shown that among these, there is a high percentage of abnormally

mental cases. Traditional types of punishments applied to this group of offenders is therefore found ineffectual.

It is also now admitted that the moral character depends upon the condition of equilibrium amid the emotional, volitional and intellectual forces working in an individual. When that equilibrium is disturbed to the point of law-breaking, then the criminal become a special object of consideration and the causes of his abnormal state, a matter of study. The criminal is always out of harmony with conventional morality and consequently community existence is threatened. It should therefore be the concern and look out of the State to take all possible measures to cure the criminal and not only render him less dangerous to society but also convert and reform him to become a desirable member of the same.

The primary object of punishment is the protection of society and reformation of the offender as observed already. However much thoughtful men may differ on the question of the mode and quantum of punishment, practically most are agreed that the reformation of the offender is an object to be borne in mind and duly considered whether in legislation or in the apportionment of sentences.

Modern criminology recognises just as modern medicine does, that when an undesirable effect is produced by a certain cause or causes, the treatment should be adapted to that cause or causes. Metaphorically speaking the individual but represents a cell in the social body. Consequently, when he is a source of harm to the body, he has no right any longer to remain a part of it until he is reformed by the State. The violation of moral sentiment is a symptom of psychological anomaly which often renders the subject incapable of social life. An offender has therefore to be observed and studied.

Starting with the idea that every true criminal is always an inferior it is then the question of ascertaining the special nature of his moral defect, that is to say, the sentiments and energies which he lacks and the evil instincts by which he is dominated. Socially, a criminal is an adolescent and a criminal man is not normal. It is a matter of intensity of conflict of adjustment to environment. It is therefore the height of folly to hope for the reformation of a criminal by imprisonment or other kind of punishment, if so soon as it is ended, he is returned back to the same environment and the same condition of existence as before. If a criminal is to be really reformed he must be placed in conditions of an altogether new existence which should convince him of the necessity of honest labour.

It is also impossible to solve the problem of punishment by the idea of absolute justice, for it will be never discovered what is absolutely just punishment which corresponds to any given crime. But the gravity of an offence is unsuceptable of correct determination for the reason that uniform criterion is lacking. The graduated scale of offences with its determination of species is nothing more than the result of an arbitrary compromise of conflicting juristic theories. It is impossible to apprise the quantum and nature of punishment without an acquaintance with the life history and the Psychology of the offender.

So, our efforts are to be directed not to measure the quantum of harm to be inflicted on the criminal, but to determining the kind of restraint best fitted to the peculiarity of his nature, when it has the single aim of deterring an enemy of society, when it is likely a measure of direct and special prevention and when it is adopted to the individuality of the offender. None is to suffer either *more or less than his individuality has herited*. Since punishment must act on the causes of crime, the aim should be to correct the

anti-social behaviour of the criminal. The nature of punishment is nothing but an exterior action of the protection and vigilance employed by the State in order to re-assert the will of its members.

If a person's behaviour during his term had been reformed in such a way as to enable him to adjust himself and adopt himself to the social environment after release, then really the penal system would have achieved something notable. To give the criminal his freedom without shaping him only means his personal effort to earn his redemption is suppressed. Then the system of captivity fixed by the law of the land crushes the little corrective energy that remains in the criminal and on the day appointed, the delinquent is returned to society without least worrying over his certain relapse to crime. Therefore, the need of the society and the need of the prisoner have to be determined only by an investigation of the present history of the criminal and the motives which tempted him to take to a life of crime.

Individualization of punishment is thus the only rational system that could be applied to the criminal in future if he is to be reclaimed and returned to society as a useful member of it. Admittedly, individualized treatment requires more time and skill than does routine punishment, but it can preserve the criminal's self-respect and make a real man of him. Kindliness anti-dates psychology by hundreds of years. But its antiquity should not lessen one's opinion of its usefulness as applied to the professional criminal. Willingness to help, to show kindness, trust and friendship may be all that a criminal will need. And if these are spared in an abundant measure to the professional criminal by the society and the state, the results achieved are bound to be encouraging and inspiring.

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## FAMOUS QUOTATIONS.

BY SRI P. K. PATTABHIRAMAN, B.A., A.L.I., P.T.C., VELLORE.

Faith is not trying to believe something regardless of the evidence. Faith is daring to do something regardless of the consequences.

Blessed are those who can give without remembering, and take without forgetting.

People are always blaming their circumstances for what they are. I don't believe in circumstances. The people who get on in this world are the people who look for the circumstances they want, and if they can't find them, make them. (*George Bernard Shaw.*)

There are no circumstances, no matter how unfortunate, that clever people do not extract some advantage from; and none, no matter how fortunate, that the unwise cannot turn to their own disadvantage. (*La Rochefoucauld.*)

The three hardest things are to keep secrets, to make good use of leisure, and to be able to bear injustice. Visit your friends more promptly in adversity than in prosperity. Choose punishment rather than dishonest gain: the former is painful but once, the latter all one's life. If you are powerful, be also kind, so that others may respect rather than fear you. Gold is tested by hard stones; men are tested by gold. (*Chilo.*)

The best practical moral rule is never to do what at any time we should be ashamed of. (N. W. Senior).

True greatness is being great in little things. (*Johnson.*)

A happy man or woman is a better thing to find than five-pound note. He or she is a radiating focus of goodwill; and their entrance into a room is as though another candle had been lit.

(*R. L. Stevenson.*)

Remember this --that very little is needed to make a happy life. (*Marous Aurelius.*)



I expect to pass through this world but once. Any good therefore that I can do, or any kindness that I can show to any fellow creature, let me do it now. Let me not defer or neglect it, for I shall not pass this way again.

Of all virtues, magnanimity is the rarest. There are a hundred persons of merit for one who willingly acknowledges it in another. *(Hazlitt.)*

True merit, like a river the deeper it is, the less noise it makes. *(Lord Halifax.)*

When anyone has offended me, I try to raise my soul so high that the offence cannot reach it. *(Descartes.)*

Politeness is the flower of humanity. He who is not polite enough is not human enough.

The best sort of revenge is not to be like him who did the injury. *(Marcus Antoninus.)*

The consciousness of having done a splendid action is itself a sufficient reward. *(Cicero.)*

Cultivate self-help; do not seek nor like to be dependent upon others for what you can yourself supply; and keep down as much as you can the standard of your wants, for in this lies a great secret of manliness, true wealth, and happiness. *(Mr. Gladstone to his Son.)*

If you lose your self-respect you have lost all.

It is the greatest manifestation of power to be calm. *(Swami Vivekananda.)*

In character, in manners, in style, in all things the supreme excellence is simplicity. *(Longfellow.)*

I attribute all my success in life to having always been a quarter of an hour before the time. *(Nelson.)*

Meet success like a gentleman and disaster like a man. *(Lord Birkenhead.)*

Suffering becomes beautiful when anyone bears great calamities with cheerfulness not through insensibility, but through greatness of mind (*Aristotle*).

You can't keep trouble from coming, but you need n't give it a' chair to sit on. (*Old Proverb*).

An honest man's the noblest work of God. (*Burns*).

A good marriage would be between a blind wife and a deaf husband. (*Montaigne*).

When it is a question of money, everybody is of the same religion. (*Voltaire*).

The place where optimism most flourishes is the lunatic asylum. (*Hovelock Ellis*).

Originality, I fear, is too often only undetected and frequently unconscious plagiarism. (*Dean W. R. Inge*).

He preaches well who lives well. (*Cervantes*).

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## EXPLOSIVES AND OTHER MATERIALS.

*Lecture delivered by the Inspector of Explosives, Bombay and the Inspector of Explosives, South Circle, Madras, to the Police cadets at the Police Training College, Vellore on 15th and 16th October 1952.*

BY SHRI S. N. LAHIRI INSPECTOR OF EXPLOSIVES, BOMBAY.

Gentlemen,

I have been advised to let you know certain aspects of explosives and other materials which you will come across in the normal course of your duties when you are in charge of stations. The information I will give you will to a great extent help you to carry out your duties.

2. I will now proceed with explosives.

3. You should first know what an explosive is. An explosive is a material which is capable of giving off a very large volume of gas very suddenly at the same time evolving a great deal of heat. The gas thus suddenly produced tends to Expand. An explosive occupies a small volume but when it burns out it suddenly gives a very large volume of gas so that it takes several times its original volume. The suddenly liberated gas exerts a very great pressure on the surroundings which will creak or burst.

4. Now the volume of gas that is developed depends not only on the total volume of the explosive but depends on the temperature also as temperature increases the volume when pressure is constant. Therefore the heat that is developed during explosion also greatly counts because pressure will directly increase by an increase of temperature.

5. Explosive may be solids, liquids or gases which when submitted to local initiatory impulses such as shock, blow friction, spark, etc., explode with rapid decomposition and the production of a considerable quantity of heat and a large volume of gas.

6. An explosive may be a single substance of one particular compound, or it may be a mixture of different ingredients: none of which may be individually an explosive. For example, gunpowder is a mixture of saltpetre, sulphur and charcoal. Neither of these ingredients by themselves are explosives but when mixed together they form an explosive. At the same time there are individual compounds which are explosives. Trinitro-Toluene (TNT), Picric Acid (Trinitro Phenol), Trinitro glycerine (liquid) are single compounds which are individually an explosive.

7. Gunpowder is a mixture of saltpetre, sulphur and charcoal in the proportion of 6:1:1 or 75 per cent: 12½ per cent: 12½ per cent. When charcoal burns carbon dioxide gas is formed and is liberated. When heat and gas are developed suddenly in confined space and in a moments time an explosion takes place. An explosive for its proper and rapid functioning needs oxygen which must not depend on the surrounding air, but must be in the material itself.

8. In principle, oxygen combines with the carbon of the explosive and forms oxides of carbon plus if it be a nitre compound, nitrogen. The main reaction will be the formation of oxides of carbon and this gas at a high temperature in a confined space will exert a great pressure resulting in the breaking up of the surroundings.

9. All explosive reactions appear to happen instantaneously, judged by the human eye and ear but actually there are great differences in the rate of explosion of different explosives. There are comparatively slow explosives as well as high explosives. For example the rate of explosion of gunpowder is a much slower than that of Trinitro-Toluene (TNT) or picric acid. The velocity of explosion of gunpowder is roughly 300 metres per second whereas that of picric acid is about 7,000 metres per second. The difference between the two can be easily guessed. There are also explosives which will be intermediate between the two.

10. T.N.T. or Picric Acid may not violently explode if just ignited. They generally need an initiator like a detonator to make them properly explode. Therefore it will be seen that TNT or Picric acid (high explosive) will have to be suitably initiated to obtain their full worth. On the other hand gunpowder just needs a spark to ignite and explode it. So there are different methods of initiating an explosive to get its full value and to even explode it. There are also other more sensitive explosives where slight excitement like friction, rubbing etc, will be sufficient to set them off. Different explosives with their different characteristics, therefore, need to be exploded differently.

11. The total work done by an explosive will depend on its energy, and on the chemical constitution of the material. Many compounds absorb heat on formation and liberate the same heat when exploded.

12. The origin of the manufacture of explosives is shrouded in mystery though old books say that it started first in China. History records that gunpowder was first made by an Englishman named Roger Bacon in about the 17th century.

13. Explosives are classified mainly in two groups, namely high explosives and low explosives. High explosives are picric acid, TNT, nitro glycerine, etc, which have a high velocity of explosion, say from 3 to 7 thousand metres per second, whereas low explosives are gunpowder, propellants etc, which have a low velocity of explosion, say 3 to 5 hundred metres per second.

14. Explosives may be solid, liquid or gaseous.

15. Blasting gelatine, gelignite, gelatine dynamite etc, are solid explosives of the nitro-compound class and are mainly mixtures of nitroglycerine and nitro-cellulose in different proportions. These are high explosives in the form of cartridges of various sizes and are generally and extensively used for mining and blasting

work. Nitro glycerine looking to some extent like Sandal wood oil is a liquid explosive. It is not likely to be met with normally in this form. It is very sensitive and rough handling even may set it off.

16. Gaseous explosives will be mixtures of petrol vapour and air, and acetyline and air in appropriate proportion.

17. Now when gunpowder is burnt, roughly 44 per cent of its weight is converted into gas so more than half its weight remains as solid products after explosion. But in the case of explosives TNT, Picric acid, gelignites etc., the whole weight will be converted into gass on explosion. This is therefore a great advantage because practically one pound of gas may be obtained from one pound of material. Then the 'kick' of such explosives will be many times more than the kick of low explosive like gunpowder.

18. Now you should not be frightened by the name of explosive. When speaking of explosives you might associate them with 'bombs' etc., but widely speaking, explosives have more nation-building value than many other things. Explosives are indispensable in the construction of dams, in mines etc., for blasting and demolition, and India being a country with very rich mineral deposits, explosives play a great part in extracting these minerals from the bowels of the earth. In some countries explosives are used in agriculture and for uprooting tree trunks etc. They are also used under water for removing rocks from the bottoms of rivers etc. The engines of some class of tractors are started by firing an explosive cartridge.

19. The point now is that you should know how to handle, keep and store these explosives properly when you come across them in the course of your duties.

20. All explosives cannot be handled safely. Arsenic sulphide and chlorate is a mixture that can be exploded by very little fric-

tion, shock, or heat. It can be exploded by the addition of sulphuric acid also. You have seen by a demonstration just now have a small blow explodes it. By its own nature therefore it is not safe to either make or roughly handle it.

21. Explosives should be reasonably safely handled during transport. If cartridges of gelignite etc., are just dropped they may not normally explode but if a very strong blow is delivered they might explode. Even when burnt in the open unconfined it may just burn. When gunpowder is exploded or burnt it will leave some stains. Similarly also a mixture of Chlorate and Arsenic Sulphide Sulphur leaves some whitish and yellowish stains on explosion. In any explosion cases these stains are very important and should be sent to us along with the object on which they appear for examinations.

Demonstrations of burning gunpowder and gelignite have then been done in the open.

22. Now I will tell you how explosives are generally used for blasting. If a rock is to be broken, first a bore hole is made in the rock. Then if gunpowder is used the hole is filled with gunpowder and tamped well with earth by a wooden piece. After filling the hole a length of safety fuse is inserted into the hole. This fuse contains a trail of gundowder inside of very good quality. Once the fuse is lit it burns right through from one end to the other. It has a regulated burning and burns at the rate of 30 seconds per foot approximately. When the gunpowder is ignited and exploded the expanding gases will shatter the rock. If a dynamite cartridge is used instead of gunpowder a small metal capsule called the 'detonator' is put into the cartridge. This detonator is about  $1\frac{1}{2}$ ' long and  $\frac{1}{4}$ ' in diameter, and contains a very small quantity of a sensitive explosive. Into this detonator a safety fuse is inserted and fixed with a crimper so that it might not come out of the detonator. The

fuse and the detonator are put into the cartridge which is placed in the bore hole and the hole is tamped well. The purpose of the safety fuse is to give a person time to light the fuse and then retire to a safe distance. With gunpowder, however, a detonator is not necessary but for explosives like TNT and picric acid, gelignite etc a detonator is necessary to initiate. Safety fuses once lit will normally burn even when immersed in water.

23. From a theoretical point of view when molecules are in an unstable condition they tend to split up and any unstable compound is subject to easy breaking up. Nitrogen is an element which is very reluctant to remain combined with other things. That is why we find so much free nitrogen in the atmosphere and even if it is combined it always has a tendency to break up. So in all high explosives you will find that they contain a very high proportion of nitrogen. As the nitrogen content is increased it becomes more and more under tension, and finally becomes unstable. T.N.T, Picric acid, nitro-glycerine have 3 nitro-groups in them. If the nitrogen content is increased too much it becomes too unstable for commercial use. An explosive for commercial use should be reasonably stable and safe for manufacture, possession, transport, use and handling.

24. There are various other explosives also which you may not come across at all in the course of your work.

25. A percussion cap explodes by pricking. Then there are other explosives in the category of low explosives such as 'propellants'. Previously gunpowder was one of the main propellants used but since 55% of the products of explosion are solids and they fouled the weapon, 'smokeless powders' have come in vogue. They are 'cordite', 'ballistite' etc in the form of cords or flakes. A high explosive shatters but a propellant (low explosive) has a regulated burning and produces a sustained pressure in the barrel of the gun.



to drive out the projectile but it should not be strong enough to burst the barrel of a weapon. If 'dynamite' is used as a propellant it will shatter the barrel.

26. Just as explosives are used for the good of humanity they are also used in subversive activities in the shape of 'bombs'. We shall now illustrate certain bombs which we came across and which you also might have to deal with in the course of your duties as police officers.

Mr. Chandrasekharan. I. E., S. C.,

*Gentlemen,*

You have been told about the chemical aspect of these explosives and I propose to tell you the manner in which these explosives are used by people who want to do harm to others. As police officers you are likely to face difficult and different situations. You might come across objects which are of a suspicious nature and you will have to do something with them until you get help from us. The best thing will, therefore be for you to have some idea about the nature of these bombs you might come across. If you can find out how they are constructed and arranged you can easily be in a position to intervene and stop the thing from causing harm. Therefore, I say it would be a very useful thing if you understand some of the usual types of bomb that we have come across in the South of India, so that you will know exactly what to do and what not to do. I will give you the details of a few types of bombs just now.

2. The most common thing that we see here is the ordinary 'cloth bound bomb'. We have demonstrated to you a little while ago how a mixture of potassium chlorate and sulphur/Arsenic sulphide becomes a very sensitive explosive. It explodes with the slight shock or friction. This is made use of in making these ordinary cloth bound bombs. To the mixture of potassium chlorate and

arsenic sulphide are added glass pieces Iron nails, gramophone needles etc and this is wrapped up in paper and then bound with cloth pieces fairly tightly in the shape of a ball or an egg. When it is thrown and strikes against an object the blow explodes the bomb and the flying pieces of glass nails, etc harm and cause injuries to the nearby people. Recently we came across a slightly interesting improvement on this. A cloth bound bomb was put into an egg shell. Normally when these bombs are found by the police they are put into water and once they get wet the potassium chlorate gets wet and the bomb becomes ineffective. But in this case the egg-shell covering made the bomb water proof.

3. Another bomb found in the Kistna District was the metallic 'kuja bomb'. Inside the 'kuja', gunpowder was filled with missiles such as rusty iron nails and glass pieces. The lid of the kuja was tightly screwed down. There was a hole in the lid with a fuse going in. The idea in this arrangement was that the firing would be initiated by the fuse and when the gunpowder exploded the missiles together with the shattered fragments of the kuja would be hurled out.

4. In 1950 in Tirupper a bottle bomb was found. In this case a glass bottle was packed with gunpowder and stones inside with a length of safety fuse as the initiator. For setting the bomb off the end of the fuse was tied with a bundle of match sticks with their heads nicely in position against the rubbing surface of a match box (the whole fitment concealed in a cloth pouch) so that when the fuse was pulled, the match heads would strike against the rubbing surface of the match and ignite the fuse and explode the bomb.

5. There were two other cases where we could see and understand that the explosive used was not gunpowder but high explosive. In a cement box with a prepared hole, a gelignite

cartridge was inserted with a safety fuse and detonator. To start the initiation a lighted cigarette was tied to the safety fuse.

6. An incendiary cum explosive bomb was found in Trichinopoly which was very cleverly constructed. Here again there was a cement block about 6" by 8" and a wooden box was used to enclose it. A glass vessel containing petrol was also put in. At the end of the fuse leading to the concrete block a roll of film was attached and to the film (which is highly inflammable) a piece of yellow phosphorous was tied up in a piece of damp cloth. Luckily the Sub-Inspector who saw it cut off the fuse and sent us information. This if it had exploded would have been a very disastrous thing because the idea behind this bomb was that the yellow phosphorous when the damp cloth became dry would catch fire and burn the film, thus lighting the fuse. The concrete block would have been shattered with a terrific effect and the bottle containing petrol would have also shattered and splashed burning oil all round.

**SHRI LAHIRI.**

27. As Mr. Chandrasekharan has explained, the purpose of the bomb is to harm others. So, for anti personnel bombs we presume that there will be some missiles in it. Missiles can be in various forms such as glass pieces, lead bits and nails etc. Those people who make bombs will have to collect the necessary materials. The shattered body of a metal bomb will also act as missiles. Gunpowder cannot be exploded by mere throwing, so a gunpowder bomb should be initiated by a fuse, but a chlorate & arsenic sulphide/sulphur bomb can be exploded by throwing. Explosives like dynamite cartridges may also be available being smuggled out from mines or quarries where they are commonly stored and used. For any bomb there must be a receptacle, an explosive, missile and a firing arrangement. Cloth bound bombs of the type my friend just explained to you actually do not need

very great confinement. The violence of explosion of this bomb is sufficiently high to hurl the missiles with force. This bomb has got its defects also and if the chlorate therein gets wet or dissolved it will not explode. Therefore to render such a bomb safe you have only to put it into water. There have been some intelligent cases of cloth bound bombs put into egg shells and cocoanut shells and sealed so that they are impervious to water.

28. Explosives can be put into glass bottles and suitably fired when they would explode and the shattered bottle pieces will act as missiles. In the same manner metal containers are used with similar effect. Soda water bottles are commonly used in making country bombs. The charge of the bombs may be gun powder, chlorate/sulphur or chlorate/sulphide mixture, gelignite etc. The gunpowder charge will need a fuse but the chlorate/sulphide mixture may or may not need a fuse. For the dynamite class of explosives, however a detonator is necessary for proper firing. There may be country made fuses which are made by drawing some shreds of cloth, jute string cotton threads etc. through a paste of gunpowder. After dipping, they are allowed to dry and then sometimes wrapped up in paper or cloth. Safety fuses are sometimes smuggled out of mines and quarries. Thin pieces of cloth smeared with arsenic sulphide/chlorate mixture may also act as fuses which can be ignited with drops of sulphuric acid generally in a capsule. In many cases fuses may fail if the gunpowder train therein be not continuous. So if the fuse is defective, it may stop burning at some stage.

29. So the main things in a bomb are the container, missiles charge and the firing arrangement. When these are recovered they should be sent to us. In Gudur a metallic torpedo shaped bomb was found. The body was in two parts held together by a screwed rod. When the safety fuse inserted through a hole in top was lighted, it exploded but it did not actually shatter as the gases

of explosion escaped through the joints of the two parts which were not sufficiently tight.

30. Besides such anti-personnel bombs there are incendiary bombs where small pieces of cloth etc are soaked in any easily combustible oil and put into a wooden box. A piece of white phosphorous wrapped in wet cloth may be placed very close to the oil soaked materials. When the wet cloth dries up after some time, the white Phosphorous ignites in contact with air and in turn sets fire to the oil soaked material. Celluloid or similar inflammable containers may be used for the whole arrangement. Even water pipes closed at both ends by screw plugs may be used as bomb shells.

31. Detonators may be fired by fuses and also by electrical device. In electric detonators, two electrical wires are connected to a thin platinum wire embedded in the fulminate composition of the detonator and when a current is passed through these wires with the help of an exploder or drycells the platinum wire gets heated and fires the detonator. In time-bombs, the help of electric detonators to fire the bomb may be taken. By appropriately connecting the terminals of the electric detonator with the hands of a clock the setting off of a properly constructed bomb can be timed. The time can be varied by changing the position of the clock-hands.

#### LECTURE DELIVERED ON 16-10-1952.

*Gentlemen,*

32. Yesterday, I talked of detonators. I have got some samples now which I will show you. This detonator contains a very sensitive fulminate class of explosive upto approximately 1/8th of its total length, and the rest of the portion is hollow, to take up the fuse. These detonators are not yet made in India. They are extremely sensitive to blow shock of friction, not to speak of sparks. Because of their sensitivity they are very carefully handled. They

are essential to initiate more stable but powerful explosives like gelignites, picric acid, TNT etc.

33. There is a difference between a percussion cap and a detonator. The purpose of the percussion cap is mainly to give a flash and nothing else to ignite the propellant charges in firearm cartridges. The percussion cap also contains a class of fulminate explosive which explodes with a flash but not with a big 'kick'. The 'kick' of a detonator is very big and that 'kick' is essential for a high explosive to efficiently explode. The 'kick' of an exploding detonator will also explode another detonator placed within an inch of it. By this you can see the risk involved in transporting detonators in bulk. The essential purpose of the percussion cap is to light a propellant or fuse, whereas the detonator must give a kick to set off a high explosive in a bore hole or in a bomb. These detonators are designed to be fired by safety fuses or electrical device - explained to you earlier. Electric detonators may be very conveniently used when a series of charges are required to be fired simultaneously but appropriately connecting the wires to an exploder or a series of batteries. There are also detonators used in bombs etc. which are fired by pricking.

34. Gun cotton is an explosive which you very rarely come across and I have not had a single case where the police have recovered or come across gun cotton during their work. Gun cotton is a slab of nitro-cotton with a hole in the centre to hold the primer and the detonator and it contains about 13 to 14% of moisture for safety reasons.

35. Now I will describe some military bombs. Previously these were not met with frequently but during the last war there were a number of military camps all over India where the army personnel used to practice with bombs. Sometimes some of these bombs were left behind when the camps were shifted or some failed

to explode and became blind during practice and villagers later finding them and tampering with them had been either killed or injured.

36. The common hand grenade is a type of military bomb used for close range fighting. It has a serrated cast iron oval shaped body which breaks on explosion into fragments flying off as missiles. The details of construction of a grenade has been shown to you. To fire the grenade the safety pin is pulled out and the grip on the lever, on throwing, goes. This releases the striking rod which fires the primer cap at the bottom which in turn sets off the detonator and the charge. The timing of the safety fuse may vary from 4 to 8 seconds. So long as the safety pin is in position nothing is likely to happen because the lever will keep the striking rod up against the pull of the spring. The safety fuse in the grenade gives a person time to throw it away to a distance before the grenade bursts.

37. Country made bombs were found which were copies of the military grenade working in the same principle. The metallic body of the grenade can be made in a foundry. Recently in Bombay Presidency I came across a Japanese service hand grenade where the principle was a little different. A top piece projecting out of the grenade was held by a safety pin. You are seeing a photograph of this bomb. To fire the grenade the pin had to be pulled out and the top piece struck against the firer's boot & thrown.

38. You might also come across military "mortar" bombs. A mortar bomb has a high explosive charge with a fuze head for setting off. In the fuze head, there is a striker pin held by a spring against a detonator. When the bomb has been fired, it flies off and strikes the ground in the enemies' camp the force of the impact overcomes the pressure of the spring and the striker pin pricks the detonator which sets off the main charge of the bomb.

The bomb has the propelling charge in the form of cartridges and augmenting charges at its tail end.

39. Another class of explosives are 'fireworks' e. g. sparklers, rockets, flower pots and so many other varieties of them. They are designed to produce loud sounds, to display colour effects etc.

40. Now the point arises as to what you should do when you come across any bomb or loose explosives or substances suspected to be explosives or of dangerous nature. You should note that the services of the Inspector of Explosives, Madras will always be available when you need it, to advise, to help and to be of assistance to you in making a bomb or explosive innocuous. Very great care must be taken when you come across any bombs. The local police officer should communicate the fact at once to the D. S. P. who will himself proceed or depute some responsible officer to the spot and carry out the following instructions.

41. If you find a bomb anywhere, until it is proved that it is not a bomb, you must treat it very cautiously. If you have any reason, however slight, to suspect that the substance you are dealing with is dangerous, then always regard it as highly explosive until such time as it is proved otherwise. The Chief Inspector of Explosives in India is in Delhi. The address of the Inspector of Explosive, South Circle is 2/29, Mount Road Madras. On very grave or urgent occasions he may be contacted by telephone. His telephone numbers are - office - 86146, and residence - 85617. His telegraphic address is 'INSSOUTH'. You can contact him any time you need his help but you must remember that his area is a very large one which comprises Madras State, Mysore, Travancore and Cochin and that he cannot be at every place at the same time. So for cases which you can deal with without any risk, you should not call him.

42. I will now give you certain advice what you should do when you come across of substances suspected to be loose explosives or bombs.



43. Very rarely you will come across liquid explosives like nitro-glycerine which looks like sandal wood oil. Supposing you do find some oily liquid believed to be nitro-glycerine. In that case you can apply the following test to make sure whether it is actually nitro glycerine or not. First try to gently remove the stopper of the bottle. *If the stopper comes out, well and good, but* there must be exercised the utmost caution in gently removing the stopper. Take a pencil and dip it in the liquid and put two or three drops on a piece of blotting or similar absorbing paper. Take this blotting paper to a distant spot, place it on a smooth-hard surface and strike it with a glancing blow. If it explodes with a sound you will know that it is an explosive. If it does not explode you can be sure that it is not an explosive. There is another test also. A drop of the liquid is placed on blotting paper and the paper is lit over a flame. If you find a greenish tint on the flame while burning then you may confirm that it is nitro glycerine. However, you will rarely come across this liquid explosive. If the above test, proves positive, you should replace the stopper very gently without shaking the bottle and with the utmost caution and it should be kept away in an isolated place under guard to see that there is no interference. A telegram should be sent to the Inspector of Explosives for assistance and it should be followed by a letter giving him all information of how it was recovered and what you have so far done. Your responsibility will cease only after the arrival of the Inspector of Explosives.

44. In the case where the stopper cannot be opened it should never be forced open or taken near a fire. Then the question arises whether it will stand shaking and rough handling in taking it to the Inspector of Explosives at Madras. In order to decide this, the bottle with the liquid should be placed in a small cloth bag. The bottom and top of the bag should be tied with two long strings and these strings should be taken over the branch of any

convenient tree to a safe distance behind any shelter. The cloth bag with the bottle should then be placed in warm water in a bucket for a few hours. You may again see if the stopper will come out. *If it does not still come out then holding one string in each hand the bottle should be vigorously shaken by pulling on each string alternately. The liquid in the bottle will then be shaken vigorously.* If nothing happens you may be reasonably sure that it will not explode by normal handling. Pack the bottle *gently in a wooden box lined with cotton or saw dust so that during transit it does not get any violent shock, blow or friction* and send it by hand along with a letter giving details of the case to the Inspector of Explosives to do the needful. No substance suspected to be an explosive should ever be sent by post.

45. *Similarly you will find solid explosives e g gunpowder, gelignite cartridges, detonators, safety fuses, fire works etc-*

46. If you can open the container, you will be able to see the substance and from the experience of the different samples I have shown you, you may get a reasonable idea of the substance. As for example if the substance be orange yellow you may presume it to be a chlorate/sulphide or sulphur mixture if black it may be gunpowder and if in the form of cartridges containing a pasty mass, it may be gelignite. *Take a small pinch of the substance, strike it a glancing blow with a flat hammer. If it explodes, it is an explosive. Some explosives like gunpowder may not explode on blow but a spark may set it off. In that case take another pinch of the substance and make a thin train of the same on a flat surface. Put some dry straw at the end of this train and carefully light it. If it vigorously flashes it may be an explosive. These are ready made tests and can be carried out anywhere to enable you to arrive at some tentative conclusion. Then take a little pinch again and put it in clean water in a tumbler and see if there is any reaction like formation of gas bubbles. This test is*

done to see that the substance does not react with water. Explosives like gunpowder and chlorate/sulphur or similar mixtures will become innocuous in water since the saltpetre in gunpowder and the chlorate in other sensitive mixtures will get wet and dissolved in water. If the substance does not react with water, put it in a clean bottle containing water pack it in a wooden or cardboard box with cotton or saw dust and send it to Inspector of Explosives for examination.

47. Some chemicals like Carbide of Calcium vigorously react in water and therefore they must not be sent under water, but if there is no reaction you can safely keep it in the water.

48. 'Dynamite' is a class of explosives in the form of cartridges should also be sent in a wooden box packed with cotton etc

49. Detonators must be handled with the greatest care. If they are roughly handled or dropped, they will sharply explode. Detonators should be packed first in a small box with cotton padding and then again into another box similarly lined with cotton or soft material so that the box will not get any shock or blow during transit. When gelignite cartridges and detonators are recovered together, which is very often the case, since one is complimentary to the other and they are usually smuggled out together, they should be kept separately and as far apart as possible because setting off of a detonator may in turn explode the cartridges lying nearby. Detonators should be suitably packed alone in a box and sent by a messenger by hand who should not also carry other explosive samples. Detonators should not be packed with other explosives at any time. Preferably the person carrying detonators should not travel in the same compartment with another person carrying other explosive samples.

50. Then comes the question of the quantity of explosives that you should send for examination. Not the whole quantity but

only a small quantity of the samples should be sent for examination. Instructions should be given to the constables carrying these things not to smoke or handle the packages roughly or to go in the vicinity of any fire, or near any person smoking. You should then communicate with the Inspector of Explosives and ask for instructions as to what to do with bulk, giving him the quantity that you have seized of the different substances. You should keep all substances recovered in an isolated place until instructions are received as to how to dispose them of. Till then nobody should be allowed to enter the place where these substances are kept. (a) Gunpowder, Gelignite Cartridges etc. and (b) detonators should be kept in separate rooms and not together and this is very important to remember.

51. We have known of cases where, in spite of our lectures and advice, explosives have been seized by police officers and we have not been informed. In a prosecution case for possession of explosives, the substance seized must first be proved to be an explosive. But I know of cases where police officers have seized explosives and on orders from the magistrate have kept these things in police armouries until the cases have been disposed of. The dynamite class of explosives are dangerous to keep for a long period because with time they are liable to deteriorate. Therefore, these instructions should be carried out strictly and police officers must realise the gravity of the situation when they come across explosives.

52. If the cork or stopper of containers of any loose explosives cannot be opened easily, give it the warm water and rough treatment stated before. If it opens then proceed as stated above. If it cannot be opened, send it to Inspector of Explosives duly packed in box lined with cotton etc.

53. I have so far spoken about loose explosives. Now I will tell you how to handle contrivances which are suspected to be bombs'.

Bombs as I have said, before are anti-personnel, and designed to harm people and damage property. The construction of the bombs will differ according to the purpose for which they are made. The cloth of bomb is mainly anti personnel where as other devices may be adopted for blowing up bridges, damaging structures etc. The bombs that you will commonly come across may be military hand grenades and mortars etc. and country bombs viz. bombs made in soda-water or other bottles, jam tins, water cistern floats, chatties, cocoonut shells, or matallic shells like 'koojas', ironpipes cast iron cylinders etc. The commonst country bomb is the cloth bound type. Then there are likely to be 'booby trap' bombs to trap police officers and do harm to them. I have also explained how you should proceed if you suspect a booby-trap - but so far we do not know of any such case in the South. Bombs may be designed to set off by moving or tilting, by fuses, by clock work and electrical device and by chemical reaction, or by shock, blow or friction. Therefore, when you suspect an object to be a 'bomb' you should not immediately touch it. Examine it from a distance and see first if there is any firing mechanism visible, and whether the mechanism is in position. In a cloth bound type bomb you can percieve that it has no visible firing arrangement and that it explodes only when it is thrown with force. In other bombs there will generally be fuses or similar firing mechanism. Sometimes you may recover bombs that are not complete and are only in the process of making but that does not take away the dangerous nature of the object. As I said, first examine the bomb from a distance and see if there is any trigger or other mechanism by which the bomb is initiated. After thorough examnation if you feel that you are not competent to touch it, write to the Inspector of Explosives for assistance. If it be a cloth bound type bomb take it up very gently and carefully and put in a bucket of clean water and allow it soak for several hours when it will be reasonably safe for handling. You should not however try to dismantle

it. Your duty is only to make it safe and send it to the Inspector of Explosives. If the bomb be in an egg or coccanut shell into which water may not get in for soaking you should not handle it and ask for assistance of the Inspector of Explosives, who will come and dismantle it at the spot.

54. Bombs made with chlorate/sulphide or sulphur mixture or gunpowder etc. can be rendered innocuous by putting them in water, but bombs made with gelignite etc cannot be rendered innocuous in the way. Very great care should be taken with bombs made of gelignite and detonators. Pulling out the fuse from the detonators of such bombs is very risky and might start off the explosion. You should not try to unscrew the top screw cap of a kuja or similar bomb and the same advice applies to hand grenades and mortars.

55. Bombs made in soda water or other bottles or metallic bodies should not be meddled with - assistance of the Inspector of Explosives should be called for.

56. For exploded bombs you may have to know the nature of the explosive which may leave indications in the form of stains. These stains are therefore very valuable to ascertain the nature of the explosive that exploded. Every precaution should therefore be taken to see that the stains on the different objects such as glass pieces, metal pieces, nails etc. are not obliterated by rough handling while sending them duly packed to the Inspector of Explosives for examination.

57. In many cases you may come across large quantities of explosives illegally manufactured or possessed for making of bombs. The destruction of these explosives is a skilled job and should not be done by you without instructions from the Inspector of Explosives.

## ACCIDENTS :—

53. During manufacture, storage, transport, handling and use of explosives there would be occasions when accidents in the form of explosions may occur. When such accidents occur, the police officer should further intimate the D. S. P. as well as the Inspector of Explosives. There are Police Standing Orders on this subject which you should know. To find out how the accident occurred it is essential that the scene of occurrence and the debris should not be disturbed except for removing any injured person or dead body until one officer of the Explosives Department arrives for technical investigation. The debris may indicate the state of things just before and also after the explosion. A guard should be placed to see that nothing is disturbed until an officer of Explosives Department arrives and you should give him all assistance in examining witnesses etc. to help him to come to a proper conclusion. Most accidents are due to negligence and non-observance of rules, but concerned people would some times try to make them out as 'acts of God' to avoid prosecution. South India is perhaps the largest manufacturing area of fireworks and there have been many serious accidents in the South. You must remember that young boys and girls under the age of 16 are prohibited from working in explosives factories. No one can legally make, possess or sell sensitive explosive mixtures like chlorate sulphide or sulphur which have been specifically prohibited by Government notification. Use of iron tools or smoking etc. in connection with manufacture, possession, transport, handling and use of explosives is strictly prohibited. In spite of these rules there are day to day violations of the same which should be checked. Therefore a police officer should take an active interest in this subject for reasons of public safety.

BY SHRI V. A. CHANDRASEKHARAN,  
INSPECTOR OF EXPLOSIVES, SOUTH CIRCLE, MADRAS.

7. Gentlemen, We have told you about explosives, I would now say about Petroleum. Every body knows the inflammable nature of petrol but there are certain very fundamental points which are quite patent and yet never strike us. Petroleum rules have been framed with a view to public safety during import, transport, storage etc. I would like to speak about some of these rules, which are frequently violated. Everybody has seen petrol being supplied to vehicles at a petrol bunk. A very common sight is to see a man come up with a can and getting it filled with petrol. This is against the rules, since no one is allowed to fill an empty loose can with petrol on the road side. The filling of petrol in cans is attended with risks and is done only under certain permitted conditions and places, for example in licensed petrol depots. Every precaution is taken at a depot and there is not much risk, but the risk is very great at a pump on the roadside. Cans fixed to a vehicle for its own use may, however, be filled from a pump but not loose cans brought by any body.

8. Passengers in public buses for their own safety must alight from the bus before it enters a petrol pump premises for taking petrol, but contrary is the case in practice. In any fire occurs during filling, all the passengers inside will be trapped, more so the women passengers.

9. Filled petrol cans are also prohibited from being carried on the tops of buses or below passengers' seats to safeguard the safety of passengers.

10. Petrol and air in appropriate proportion form an explosive mixture. As a matter of fact, what happens in a car engine is a regulated explosion of a petrol/air mixture. Calcium Carbide in contact with water fires off acetylene gas - a highly inflammable gas and a mixture of this gas and air forms an explosive



mixture. Therefore calcium carbide coming into contact with moisture is dangerous.

11. The Petroleum & Calcium Carbide Rules therefore, say that where such things are stored adequate ventilation should be provided in the room and other safety precautions to avoid fire hazards should be taken.

12. The Govt. of India brought out rules in 1948 to regulate the storage, transport etc. of cinematograph films, having nitro-cellulose base which are highly inflammable. So many unfortunate fires have occurred with these films resulting in the loss of lives and property.

13. Film fires are so quick and intense that they give very little scope for any body to escape. The noxious fumes also paralyse a man. That is why rules have been framed, regulating the storage, transit and handling of films. These rules apply to only those films which have nitro cellulose base. There have been improvements in the manufacture of films and now films with a safety base where high combustible quality has been eliminated are available in the market. In course of time, this safety base film may completely replace the inflammable nitro-cellulose base film. These rules are not applicable to safety base films but it will take some more years before all inflammable films are done away with.

SRI S. N. LAHIRI, I.E., W.C.

53. In the interest of public safety the Govt. of India have framed Explosive Rules, Gas Cylinder Rules, Petroleum rules Carbide of Calcium Rules and Cinematograph Film rules. The purpose is not restrictive but protective the view being 'public safety'. Petrol, is inflammable, and when mixed with air it forms an explosive mixture. An apparently empty petrol can will generally contain a mixture of petrol vapour and air and is therefore more dangerous than a filled petrol can, as in the former case

there is explosion risk and in the later fire risk. There have been very bad accidents due to carelessness in handling empty petrol cans. The petrol pumps are meant to cater to the needs of vehicles.

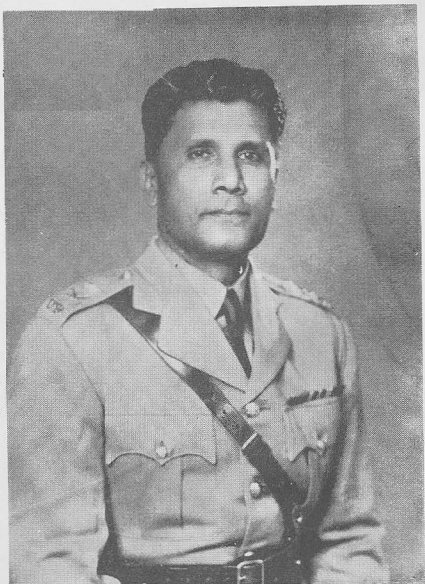
60. The reason why cans should not be filled in petrol pumps is that the pumps are always located in public places and during filling of cans lot of petrol vapour will be emitted and any passerby who carelessly smokes in the vicinity or any small fire nearby may start a fire. Petrol vapour is heavier than air and therefore does not easily dissipate.

61. Petrol is lighter than water and floats on it. Therefore water must not be used to put out a petrol fire, as the fire would only spread with the spray of water. The common way to put out a petrol fire is by smothering the fire with sand or foam equipment. That is why petrol pumps are required to have at least two buckets of sand on the premises.

62. I have also told you in detail of several accidents of interest with petroleum, explosives and film and the reasons therefore and in most of these cases carelessness, non-observation of regulations were the primary causes.

63. And finally I would entreat you to take an active interest in this subject for public safety and when you see people doing something leading to a hazard, prevent him. Do not think it as an extra work for you, but it is your work. I hope this lecture, though short will put you in good stead and help you to carry out your duties properly when occasion arises. We are very glad that you all have given us a patient hearing -

Thank you, Gentlemen.



Sri J. Devasahayam, B.A., I.P.,  
who assumed charge as Inspector - General of Police  
Madras, on 15-5-1953.