REPORT ON SYMPOSIUM ON AIR POLLUTION UNIVERSITY OF W.A. - 21st MAY 1970

by

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SUMMARY

1. The problem generally lacks recognition.

2. A cheap method of desulphonisation of pollution gases required at the refinery.

3. Trapping of pollutants associated with buildings and topographical features. Design of buildings could possibly mitigate this cause.

4. CO is the most serious hazard in pollution because of effect on haemoglobin and insidious immobilisation thereof.

5. True physical data on smoke stack design seems lacking and misleading: a dumping spot inevitable at a distance from stacks and hence emission precipatators essential.

6. Particulant pollution serious because of assistance in SO_3 production and hence H_2SO_4 acid mists.

7. No mention of salt water in water catchments.

INTRODUCTION

The members of the Symposium were addressed by the following speakers:-

1. Mr. D. RIGDEN - "Industrial Sources of Air Pollution" (B.P. REFINERY of W.A.)

2. Mr. C.W. MACKEY - "Meteorological Factors in Distribution of Pollutants". (COMMONWEALTH METEOROLOGICAL BUREAU)

3. Dr. D.P. LETHAM - "Medical Aspects of Air Pollution" (P.H.D. PERTH)

4. Mr. CARGEE - "Problems and Methods of Detection and Measurement of Atmospheric Pollution" (RESEARCH DEPARTMENT OF UNIVERSITY OF W.A.)

5. Dr. H.H. MACEY - "Prevention and Control of Air Pollution " (SENIOR ENGINEER P.H.D. CLEAN AIR DEPARTMENT?.

6. Mr. P.F. BRINSDEN - "Air Pollution and the Law"

7. Mr. K. ADAM - "Air Pollution in Relation to Town Planning and Urban Geography" (PLANNING OFFICER T.P. DEPARTMENT).

At the conclusion of each address brief questions were invited from the audience.

To set down in detail, the full content of each speaker's talk is not considered warranted - rather, it is felt that the main conclusions as to:

1. Nature of the problem as it effects the community (city and rural).

2. How the problem can be overcome (if at all).

3. Detection problems.

4. Aspects of law associated with pollution.

5. Some of the medical aspects of results of pollution.

6. Possible future planned avoidance or diminution of pollution.

Professor Bayliss, as Chairman made the following points at the commencement of the Symposium, drawing listeners' attention to:

1. Recognition that a problem is in existence in relation to air pollution.

2. The quantitative measurement of extent of the pollution and methods of control.

3. Contemplation of control involves value judgement as to the amount of control needed by the community and.

4. A legal problem follows in that having made judgement, social legislation is required to implement measures.

MAIN POINTS FROM EACH SPEAKER

Mr. RIGDEN

1. The problem with oils is one of phytochemical smog e.g. Los Angeles.

2. Desirability of high level effluent stacks to avoid visibility of NO_2 gas which can be seen at 20 ppm.

3. Hydrocarbon vapours cut down by use of floating roof tanks: Cost of waste gases equal to $50 - $200 per day.

4. A cheap method of desulphonisation required with recovery as acid or sulphate. For every ton of fuel at $3 treated, $2 can be recovered as SO_4.

5. At an output of 6 ppm. of CO_2 per month half this amount is removed by natural processes.

6. Los Angeles smog problem not likely in Perth because of favourable climate. Smog caused by SO_2.

7. Diesel units emit little smog if <u>properly operated</u> less than petrol motors.

8. Dried aluminium mud used as catalyst in control of smoke emissions.

TABLE OF ENERGY USED IN W.A. AS % OF MILLION OF TONS OF FUEL USED

FUEL TYPE	TONNAGE USED	AUST. %	W.A. %
Fuel Oil (ex Refinery)	25.5	14.8	15.5
Refinery Fuel & Gas	9.5	5.8	21.6
Coal	17.6	48.0	2.6
Wood	6.5	2.4	19.2
Bagasse	-	1.8	-
M/Spirit	22.2	17.9	8.7
Dist. and Diesolene	16.6	8.3	13.9
Kerosene & H/Oil	1.7	1.5	8.1
L.P. Gas	0.4	0.7	4.1
Natural Gas	-	0.1	-
Hydro Electricity	-	1.7	-
TOTAL	100	100	70

Mr. MACKEY

1. Sources of pollution are: people, radioactive material, dusts, volcanic explosions and ozone from lightning discharges.

2. Air constantly in motion vertically and horizontally cooling with height (35-40,000) is zone of major pollutants.

3. Energy balance arrived at by short wave radiation heating the earth with a balance achieved with long range radiation: maximum CO_2 or moisture in the air affect this balance and tend to make earth heated similarity to a heat engine.

4. Los Angeles smog condition aggravated by the inability of smog gases to rise over the mountains and hence is in an unstable condition over the city, moving to and fro from sea to mountains with concentration of pollutants in a particular area. Small scale effects; behind buildings and in hollows, etc. caused by air flow swirls.

5. Jet stream air flows 60 - 200 mph speeds.

Dr. LETHAM

1. CO contaminates O_2 and is picked up by blood haemoglobin becoming fixed there and disallows O_2 to go to body tissue.

2. Incapacitation occurs in a person when ½ the haemoglobin is so immobilized - referred to as an "ANOXIC state".

3. With 2% carboxy in the blood impairment of normal behaviour.
   5% (30 ppm.) - impairment of vision and less efficient exercise.
   5% - 10% - hearing and circulation affected.
   10% - 20% - 1st symptoms of CO poisoning headache (in some people)

4. Smokers normally have 4 - 5% CO.

5. Sulphur oxide - parts of this are oxygenised to SO_3 - H_2O - H_2SO_4 acid mist, using ferrous metals as catalyst and therefore more potent than SO_2.

6. Metal particulants - smaller than particles are worse because of surface area involved capable of producing SO_3.

7. 5 ppm. seems normal for healthy persons i.e. SO_3.

8. There is a correlation in world figures between SO_2 levels and respiratory troubles.
   (after correction for smoking etc.)

9. Lead - pollution of the order of 25 microgrammes per day but CO considered worse than lead.

Mr. CARGEE

1. Detection and measurement - 20% of SO_2 is produced by man - 80% by biological decay.

2. 15% of global hydrocarbons are made by man - the rest from trees, methane gas etc.

3. Portions to be measured - gaseous pollutants, particulants and pollutants
   (gaseous - organic and inorganic)

Inorganic	Organic
Fly Ash Blasting Coal etc.	Aerosols high molec. wt.

4. Principle of detection

   $SO_2 + H_2O_2 - HSO_4^- + H^+$ (increase of elect. condictivity to give SO_2 quantity)

5. Items checked O_3 (no specific tests)

   SO_2 CO, NO & NO_2 & O_3 - the latter measured by rates of production of cracks in rubber bands.

Dr. MACEY

1. Smoke stack design and consideration.

2. Noted that various heights of chimneys are illogical according to tables and various formulae - ignorance of true facts evident but not stated.

Mr. BRIMSDEN

1. No definition of which Minister is responsible.

2. Regarded as a somewhat unfinished Act.

3. Penalty provisions should be tidied up.

4. No specification as to who enforces the Act, anybody in the community can lodge a complaint - if successful pocket the fine!

5. Apparent lack of will to control pollution - Local Government reluctant to do so - Minister can insist on them doing so.

6. Law of nuisance is also involved.