PCB'S AND THE SCIENCES --

- HEALTH SCIENCE
- POLITICAL SCIENCE
- SOCIAL SCIENCE AND
- SCIENCE FICTION

TODAY I'D LIKE TO BRIEFLY DISCUSS VARIOUS SCIENCE ASPECTS OF PCB'S, INCLUDING: HEALTH SCIENCE
POLITICAL SCIENCE
SOCIAL SCIENCE AND
SCIENCE FICTION

HOPEFULLY, I'LL GIVE YOU A NOT-TOO-TECHNICAL VIEW OF MY PERCEPTION OF THE PRESENT AND FUTURE TRENDS AND ATTITUDES IN THE PCB ARENA.

POLYCHLORINATED BIPHENYLS, PCB'S, HAVE RECEIVED CONSIDERABLE ATTENTION OVER THE PAST DECADE BECAUSE OF INCREASING CONCERNS ABOUT THEIR POSSIBLE EFFECTS ON HUMAN HEALTH AND THE ENVIRONMENT.

AS A CLASS OF CHEMICALS, PCB'S ARE ONE OF THE MOST MISUNDERSTOOD, MOST FEARED AND MALIGNED GROUPS OF CHEMICALS KNOWN TO MAN. THEY HAVE BEEN SINGLED OUT IN THE CONGRESS, LEGISLATURES AND NEWS MEDIA OF THIS COUNTRY AS POSING A GENERAL THREAT TO HUMAN HEALTH. CERTAIN ENVIRONMENTALISTS, REGULATORY OFFICERS, LAWMAKERS AND THE MEDIA HAVE DUBBED PCB'S AS "DEADLY TOXINS", "HUMAN AND ANIMAL CANCER-CAUSING AGENTS" AND "LIFE THREATENING CHEMICALS." THIS HAS RESULTED IN AN UNWARRANTED PUBLIC PERCEPTION THAT EVEN THE SLIGHTEST PRESENCE OF PCB'S REPRESENT A SIGNIFICANT HAZARD TO HEALTH AND THE ENVIRONMENT.

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PCB'S ARE THE ONLY CHEMICAL SUBSTANCE WHICH CONGRESS SPECIFICALLY TARGETED FOR IMMEDIATE REGULATORY ACTION BY THE EPA ADMINISTRATOR. THE PCB BAN REGULATIONS ARE BASED ON EPA'S BELIEF THAT ANY EXPOSURE OF HUMANS TO PCB'S IS SIGNIFICANT AND MAY PRESENT AN UNREASONABLE RISK.

TODAY, MANY SCIENTISTS BELIEVE SUBSTANTIAL EVIDENCE EXISTS TO SUPPORT THE CONCLUSION THAT LOW-LEVEL EXPOSURES TO PCB'S DO NOT PRESENT A RISK TO HUMAN HEALTH OR THE ENVIRONMENT.

PCB'S ARE ONE OF THE "MOST STUDIED" CLASSES OF CHEMICALS KNOWN TO MAN. MUCH NEW INFORMATION HAS BEEN PUBLISHED ON THE HEALTH EFFECTS OF PCB'S SINCE EPA ISSUED ITS BAN REGULATIONS IN 1976. A RECENT SEARCH OF THE PUBLISHED LITERATURE SHOWS THAT OVER 5,000 SCIENTIFIC AND TECHNICAL PAPERS ON PCB'S HAVE BEEN PUBLISHED FROM 1976 TO SEPTEMBER, 1981. CONGRESS AND EPA BASED THEIR FINDINGS OF ADVERSE HEALTH EFFECTS OF PCB'S ON LESS THAN 2,800 SCIENTIFIC ARTICLES PUBLISHED DURING THE 10-YEAR PERIOD PRIOR TO 1976. THESE ARTICLES INCLUDED ONLY ONE HUMAN EXPOSURE INCIDENT.

OF PARTICULAR SIGNIFICANCE IN THE NEWLY PUBLISHED SCIENTIFIC REPORTS ARE THOSE RELATING TO HUMAN EXPOSURE OR EPIDEMIOLOGY STUDIES. WITHIN THE LAST 24 MONTHS A LARGE NUMBER OF HUMAN PCB EXPOSURE STUDIES HAVE BEEN PUBLISHED WHICH SHED SIGNIFICANT NEW LIGHT ON THE PCB HEALTH EFFECTS ISSUE.

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IN ADDITION, SEVERAL INDEPENDENT GROUPS OF SCIENTISTS (ABOUT SIX AT LAST COUNT) HAVE RECENTLY RE-REVIEWED THE TOTAL BODY OF PCB HEALTH AND TOXICITY LITERATURE WITH PARTICULAR EMPHASIS ON THE HUMAN EXPOSURE STUDIES IN CONJUNCTION WITH THE NEW PCB RULEMAKINGS BEING CONDUCTED BY EPA UNDER MANDATE OF THE FEDERAL DC CIRCUIT COURT. THEIR INDEPENDENT CONCLUSIONS, WHICH ARE SUPPORTIVE AND CONSISTENT WITH EACH OTHER, CAN BE SUMMARIZED AS FOLLOWS:

1. PCB'S GENERALLY DO NOT POSE ANY SERIOUS RISK OF INJURY TO HUMAN HEALTH.
2. PCB'S ARE NOT HUMAN CARCINOGENS.
3. PCB'S HAVE NOT BEEN SHOWN TO ADVERSELY AFFECT HUMAN REPRODUCTION OR CAUSE BIRTH DEFECTS. PCB'S ARE NOT MUTAGENS OR TERATOGENS.
4. THE ONLY PROVEN ADVERSE HUMAN HEALTH EFFECTS RESULTING FROM PCB'S ARE TWO SKIN CONDITIONS: DERMATITIS AND CHLORACNE, WHICH ARE REVERSIBLE AFTER DISCONTINUANCE OF EXPOSURE.

I SHOULD EMPHASIZE THAT THESE CONCLUSIONS ARE NOT NEW OR STARTLING TO SCIENTISTS WHO HAVE BEEN INVOLVED IN PCB STUDIES OVER THE PAST DECADE. HOWEVER, THE WEIGHT OF THE NEW EVIDENCE UPON WHICH THEY'RE BASED SHOULD REINFORCE THE CREDIBILITY AND RESOLVE THE ISSUE OF PCB HEALTH CONCERNS.

AS RECENTLY AS 1979, THE NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES REVIEWED THE SUBJECT OF PCB'S. IN THE REPORT PREPARED BY THE COMMITTEE ON THE ASSESSMENT OF POLYCHLORINATED BIPHENYLS IN THE ENVIRONMENT, THE NAS GROUP CONCLUDED:

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> ".....PCB'S ARE PERSISTENT, AND ARE LIKELY TO ACCUMULATE. PCB'S DO NOT APPEAR PARTICULARLY TOXIC FOR SHORT-TERM EXPOSURE, BUT RESULTS ARE SUBJECT TO INTERPRETATION."

A SPECIFIC EXAMPLE OF PCB MISINFORMATION IN THE HEALTH SCIENCES CAN BE ILLUSTRATED BY THE SCIENCE OF EPIDEMIOLOGY.

THE MOST MEANINGFUL INFORMATION FOR ASSESSING A CHEMICAL'S CHRONIC HEALTH EFFECTS CAN BE DERIVED USING KNOWN AND AVAILABLE HUMAN DATA FROM PROPERLY DESIGNED EPIDEMIOLOGY STUDIES. EPIDEMIOLOGICAL STUDIES ARE OFTEN POSSIBLE IN SITUATIONS WHERE PEOPLE HAVE BEEN EXPOSED FOR MANY YEARS.

A RECENT REVIEW OF TWENTY-ONE EPIDEMIOLOGY STUDIES FOUND THAT DURING OCCUPATIONAL EXPOSURE, PCB'S CAN CAUSE TEMPORARY SKIN PROBLEMS. YET, THERE ARE NO CLINICALLY OBSERVABLE LONG-TERM HUMAN HEALTH EFFECTS, INCLUDING THE OCCURRENCE OF CANCER. STUDIES OF NON-OCCUPATIONALLY EXPOSED POPULATIONS FOUND NEITHER DERMATITIS NOR OTHER CLINICAL EVIDENCE OF EXPOSURE-RELATED EFFECTS.

MANY OF THE RECENT EPIDEMIOLOGY STUDIES INCLUDE DATA ON LARGE NUMBERS OF INDUSTRIAL WORKERS WHO, OVER MANY YEARS, WERE OCCUPATIONALLY EXPOSED TO PCB'S. THESE OCCUPATIONAL EXPOSURES, IN MOST CASES, INVOLVED CHRONIC PCB EXPOSURE LEVELS WHICH WERE ORDERS OF MAGNITUDE GREATER THAN ANY REASONABLY FORESEEABLE UNDER EXISTING REGULATIONS. A COMPARATIVE REVIEW OF THESE OCCUPATIONAL-EXPOSURE STUDIES REVEALS THAT, LIKE OTHER CHEMICALS, PCB'S CAN CAUSE ADVERSE HEALTH EFFECTS. BUT IN MOST RESPECTS, THESE EFFECTS HAVE BEEN MINIMAL.

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WHILE DERMATITIS AND CHLORACNE HAVE BEEN NOTED, THESE SKIN DISORDERS WERE REVERSIBLE AFTER DISCONTINUING THE EXPOSURE. IN SPITE OF OVER 50 YEARS OF USE, NO CAUSAL RELATIONSHIP HAS BEEN ESTABLISHED FOR ANY SPECIFIC TYPE OF CANCER, NOR HAS IT BEEN PROVEN THAT THE INCIDENCE OF CANCER MORTALITY HAS INCREASED FROM PCB EXPOSURE.

A RECENT STUDY BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH) FOCUSED ON 2,500 ELECTRICAL EQUIPMENT MANUFACTURING WORKERS. OVER HALF OF THE COHORT WAS OCCUPATIONALLY EXPOSED IN EXCESS OF 20 YEARS. SOME OF THE WORKERS WERE EXPOSED TO PCB'S FOR AS LONG AS 40 YEARS. THE STUDY FOUND NO EXCESS IN TOTAL MORTALITY, NOR IN MORTALITY DUE TO CANCER, CARDIOVASCULAR DISEASE OR NEUROLOGICAL DISORDERS. SINCE THIS STUDY FAILED TO DEMONSTRATE AN EXCESS CANCER RATE IN A HIGH-EXPOSURE POPULATION, IT REASSURES US THAT FUTURE STUDIES ARE UNLIKELY TO SHOW ANY INCREASED RISK OF CANCER FROM PCB'S. AS ADDITIONAL DATA HAVE BEEN ACCUMULATED ON THE YUSHO INCIDENT -- THE FIRST REPORT OF SIGNIFICANT HUMAN HEALTH EFFECTS DUE TO PCB EXPOSURE -- IT APPEARS THAT IT WAS NOT THE PCB'S WHICH WERE RESPONSIBLE FOR THE ADVERSE HEALTH EFFECTS OBSERVED BUT THE EXTRAORDINARILY HIGH LEVELS OF IMPURITIES IN THE PCB MIXTURE COMMERCIALLY MANUFACTURED BY THE JAPANESE.

THE CONCLUSIONS REACHED BY ALL OF THE EPIDEMIOLOGIC STUDIES ARE IN DISTINCT CONTRADICTION TO STATEMENTS APPEARING IN THE PRESENT COURT OF APPEALS DECISION THAT "PCB'S ARE EXTREMELY TOXIC TO HUMANS", AND THAT "EPIDEMIOLOGY DATA AND EXPERIMENTS ON LABORATORY ANIMALS INDICATED THAT PCB'S POSE CARCINOGENIC AND OTHER RISKS TO HUMANS."

THE MOST RECENT 1981-1982 REVIEWS WERE CONDUCTED INDEPENDENTLY BY SEVERAL GROUPS OF SCIENTIFIC EXPERTS FROM THE FIELDS OF CHEMISTRY, TOXICOLOGY, PATHOLOGY, EPIDEMIOLOGY, INDUSTRAL HYGIENE AND MEDICINE, INCLUDING OCCUPATIONAL MEDICINE, TO NAME A FEW. THE DATA AND CONCLUSIONS FROM THESE STUDIES WERE RECENTLY SUBMITTED TO THE U.S. EPA FOR THEIR USE IN DEVELOPING NEW PCB REGULATIONS. IN ADDITION, EPA IN MAY OF 1982 SPONSORED A TWO-DAY SYMPOSIUM OF LEADING WORLD SCIENTISTS AT BETHESDA, MARYLAND, TO REVIEW AND DISCUSS "THE RECENT ADVANCES IN EXPOSURE, HEALTH AND ENVIRONMENTAL EFFECTS STUDIES OF PCB'S." HOWEVER, THERE IS LITTLE PUBLIC AWARENESS OF THESE SIGNIFICANT STUDIES, THEIR REVIEWS AND THEIR IMPLICATIONS. IN ESSENCE, THESE CONCLUSIONS FROM ALL OF THE REVIEWS TO-DATE DEMONSTRATE AND STATE IN "LEGALESE" TERMS THAT:

1. PCB'S PER SE DO NOT REPRESENT AN UNREASONABLE RISK TO HUMAN HEALTH AND THE ENVIRONMENT.
2. THAT ANY EXPOSURE TO PCB'S IS NOT SIGNIFICANT.

HOWEVER, EPA HAS NOT BASED ITS RULES ON A RISK ASSESSMENT USING SUCH RECENT DATA. THIS LEADS US TO THE SUBJECT OF PCB'S AND POLITICAL SCIENCE.

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DESPITE ALL THE RHETORIC IN GOVERNMENTAL AGENCIES, CONGRESS AND OTHER LEGISLATIVE BODIES THAT SAYS: GOOD REGULATIONS SHOULD BE BASED UPON GOOD SCIENCE AND THAT WHENEVER POSSIBLE HUMAN EXPERIENCE SHOULD TAKE PRECEDENCE OVER ANIMAL STUDIES AND TESTS EVALUATING RISK OF CHEMICALS, WHY CAN'T AN ISSUE AS BROAD AS PCB'S GET A DELIBERATE, REASONABLE HEARING AND REVIEW? THE ECONOMIC IMPACT OF PCB RULES AND REGULATIONS ON THIS NATION, TO BOTH INDUSTRY AND THE CONSUMING PUBLIC, IS OF THE ORDER OF BILLIONS OF DOLLARS. THIS HAS BEEN DEMONSTRATED BY EPA IN THE RECENTLY PROPOSED NEW ELECTRICAL EQUIPMENT RULES (THE "TOTALLY ENCLOSED" AUTHORIZATION).

THE ANSWER, THOUGH NOT CLEAR AND SIMPLE, IS POLITICS!

PCB'S WERE SPECIFICALLY NAMED AND ADDED TO THE TOXIC SUBSTANCES CONTROL ACT AS AMENDMENTS FROM THE FLOORS OF BOTH THE SENATE AND HOUSE OF REPRESENTATIVES. IT WAS A VERY EMOTIONAL TIME -- AN ELECTION YEAR. THE PUBLIC WAS AROUSED BY SCARE STORIES AND HEADLINES IN THE NEWS MEDIA. PCB'S WERE LABELED AS "DEADLY TOXINS" AND "CARCINOGENS" BY VARIOUS MEDIA SEGMENTS, AND THESE LABELS PERSIST TODAY BASED UPON RUMOR, BAD SCIENCE, INCOMPLETE DATA AND THE LIKE.

IN 1980, PCB'S WERE AN ISSUE HERE IN MISSOURI IN THE GOVERNOR'S RACE. CERTAINLY AN AROUSED AND EMOTIONAL PUBLIC HAS A TREMENDOUS INFLUENCE ON THE POLITICAL PROCESS. HOWEVER, I BELIEVE IT'S IMPROPER TO PLAY UPON REAL, BUT PERHAPS UNJUSTIFIED, FEARS OF PEOPLE WHO ARE LOOKING FOR TRUE ANSWERS AND INTERPRETATION TO COMPLICATED HEALTH AND SCIENCE QUESTIONS TO SATISFY POLITICAL AMBITIONS.

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THE MISINFORMATION AND MISSTATEMENT OF FACTS THAT OCCUR IN SUCH EMOTIONAL SITUATIONS, INCLUDING POLITICAL DEBATE, CAN NEVER BE RECALLED NOR REBUTTED TOTALLY.

IT'S SORT OF LIKE THE QUESTION "WHEN DID YOU QUIT BEATING YOUR WIFE?"

EVEN LEARNED JUDGES IN OUR HIGHEST COURTS PICK UP THESE MISSTATEMENTS AND HALF-TRUTHS AND BASE VERY IMPORTANT DECISIONS HAVING SIGNIFICANT SOCIAL AND ECONOMIC IMPACT ON THEM. IN ONE CRITICAL AND FAR-REACHING DECISION IN 1980, A FEDERAL APPELLATE JUDGE CONCLUDED:

> "WE FEEL CONSTRAINED TO ADD ONE FINAL NOTE TO EMPHASIZE OUR CONCERN IN THIS CASE. HUMAN BEINGS HAVE FINALLY COME TO RECOGNIZE THAT THEY MUST ELIMINATE OR CONTROL LIFE-THREATENING CHEMICALS SUCH AS PCB'S, IF THE MIRACLE OF LIFE IS TO CONTINUE AND IF EARTH IS TO REMAIN A LIVING PLANET."

THIS SOUNDS LIKE THE FIRST VOLLEY OF A MAN ABOUT TO RUN FOR POLITICAL OFFICE! IT CERTAINLY RANKS UP THERE WITH MOM, BASEBALL AND APPLE PIE AS POLITICAL INSTITUTIONS.

SOCIAL SCIENCE AND PCB'S IS MUCH EASIER TO DEFINE. A SIMPLE DEFINITION WOULD BE THE WAY PEOPLE AND SOCIETY IN GENERAL REACT TO PCB INCIDENTS AND ISSUES. THIS MANIFESTS ITSELF DAILY IN VARIOUS MEDIA PRESENTATIONS AROUND THE COUNTRY. I'D LIKE TO ILLUSTRATE THIS POINT WITH NEWSPAPER HEADLINES OF A FEW RECENT SELECTED, NATIONWIDE INCIDENTS.

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1. BINGHAMTON, NEW YORK - OFFICE BUILDING TRANSFORMER FIRE
JANUARY/FEBRUARY, 1981

2. COYOTE CREEK, CALIFORNIA - TRANSFORMER SPILL
JULY, 1981

3. SONOMA, CALIFORNIA - HOSPITAL FLUORESCENT LIGHT BALLAST LEAK
JULY, 1981

4. SAN FRANCISCO, CALIFORNIA - GAS MAIN RUPTURE
AUGUST, 1981

5. OTHERS - WITHOUT HEADLINE ILLUSTRATIONS

A. PG&E REMOVAL OF ALL PCB CAPACITORS FROM POWER DISTRIBUTION SYSTEM. COST IN EXCESS OF $50 MILLION ($20 MILLION/YEAR INTEREST).

ADD THAT TO YOUR ELECTRIC BILL.

B. CALIFORNIA FOLK HERO.

WELL, AS TO PCB'S AND SCIENCE FICTION, I DON'T THINK A WRITER COULD DO MUCH BETTER FOR A SCRIPT THAN USING AS AN OUTLINE SOME OF THE NEWS HEADLINES WE'VE JUST DISCUSSED.

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IN THE TIME OF STAR WARS, PAC-MAN, BLADE RUNNER, THE ANDROMEDA STRAIN AND E.T., IT WOULD BE EASY TO CONJURE UP A STORY FEATURING AN AN INSIDIOUS CREATURE, A PCB MOLECULE, LURKING IN A SPACESHIP JUST WAITING TO INVADE THE ELECTRICAL SYSTEM OF SOME PLANET TO CREATE HAVOC AND OVERPOWER THE POPULACE.

HOPEFULLY, THE PUBLIC IS SMART ENOUGH AND WILLING TO WEIGH THE FACTS AND RISKS SO THAT MEDIA HORROR STORIES BECOME JUST MORE SCIENCE FICTION AND WE CAN GET ON WITH THE JOB OF PROPERLY DISPOSING OF PCB'S, CONTINUING TO REDUCE LEVELS IN THE ENVIRONMENT AND RESEARCHING SUITABLE SUBSTITUTES TO MAINTAIN OUR QUALITY OF LIFE IN THE ELECTRICAL GENERATION.