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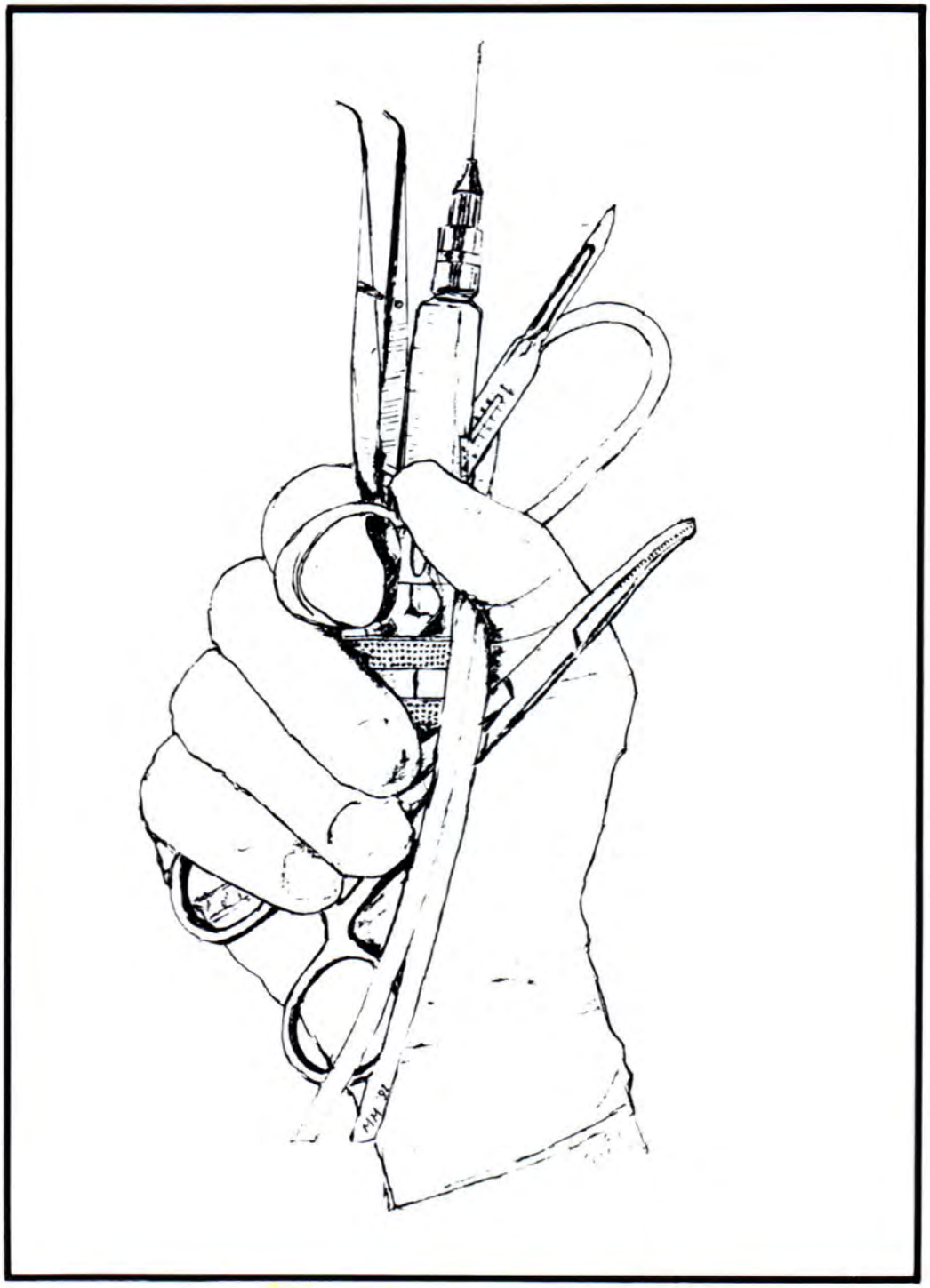

From the Editor's Desk

The final edition of the Western Medical Journal for academic year '88-'89 predictably contains a certain amount of retrospection. Connie resurrects those haunting memories of second year, we pay tribute to graduating cartoonist Tom Song, and our "centrefold" takes a look at some of the faces and events that made this year a memorable one. Which brings me to my own piece of literary rumination for this edition: Clerkship.

It never ceases to amaze me how the brain is capable of trimming away the rough edges of life, leaving, for the most part, recollections of a "kinder, gentler" nature. It's as if the neurons cursed with recording the "bad times" go into a black depression, causing a hyperpolarization that locks away their secrets forever. Perhaps they're just more susceptible to the supraphysiologic doses of EtOH that are used to chase away icons that caused so much "gnashing of the teeth". I suppose it makes good botanical sense that from those occasions whence you were showered with the most manure, something beautiful should later grow.

So it is with clerkship. This point is graphically driven home by the cartoon on this page, courtesy of a spontaneous inspiration on the part of Dr. Reider, at CHWO.

The basic problem revolves around the concept of expectations. For instance, I did not expect, when I started by first rotation, medicine, to look back on my summers on the assembly line as "those halcyon days". I didn't expect to be on call my first night on medicine. I didn't expect someone to phone and tell me my pager had gone dead, and one of the patients had gone the same way as my pager. I was fairly certain this was something they had taught us was a "bad thing", but they hadn't taught me, at that point, about "DNR's".

I didn't expect to know so little. Or perhaps I was just overwhelmed by how the residents and consultants knew so damn much. This only served to confirm my theory on learning that I developed at the end of second year. Teel's maxim: "There is no such thing as mastery of new knowledge, there is only on-going acquisition of an appreciation for the depths of one's ignorance."

Being a clerk is much like being a bug. We are tolerated generally because we are too insignificant to bother squishing, but if we make too much noise or get in anyone's hair - splat! I'm not sure why they don't call us that - "clinical bug". It's more accurate and descriptive than clinical clerk. Clinical "clerk" confuses people - it makes them ask questions like, "Why is a secretary doing a pelvic on my daughter?!" There is some merit in the title, I suppose. The dictionary defines a clerk as "any person able to read or write," and you often do find yourself in the position of being a highly-educated, debt-ridden scribe. Ordering godonlyknowswhatagenase levels on something vile draining from Mrs. Flibbenguffles' I-better-not-say-what.

In clerkship you go through stages. The most celebrated of these is the CCCC (Clinical Clerk Cynicism Complex). CCCC can be diagnosed on the appearance of the pathognomonic facies demonstrated by the poor clod on this page. It's that look of, "Sure, I'd **love** to admit 7 more 112 year-old medical disasters for a complete investigation of the cause for their supratentorial emphysema while you pontificate interminably about the differential diagnosis for 'blue hair' after I've spent the entire night on call medically achieving the perfect consistency stool and then you suggest I present a discussion on the role of NSAIDS in the Vogt-Koyanagi-Harada variant of epilepsy in myopic pygmies with Zollinger-Ellison Emmerson, Lake and Palmer Syndrome, Type 71B, that will be a handy tidbit for a G.P. in South Armpit and almost as much fun as slipping a spinal needle into my retinal arteries and aspirating my choroid plexus".

The CCCC goes hand-in-hand, of course, with guilt. We feel tremendous guilt because of the seemingly irreconcilable conflict between our role as caring good deed-doers, and the frustration that is endemic to our position in the hierarchy. In "those halcyon days" of first year (enter selective memory), we didn't picture ourselves in clerkship talking merrily with the team about "turfing" a patient to some other service. This wasn't what we expected.

We lose sight of the fact that as 'clerks' we start 22 new jobs (teams) in 52 weeks. Let's see how well

any consultant adapts to that. Now, take the same consultant and pith him. Voila, you have a clerk - 22 new jobs that we know next to diddly about, scratching the surface of 22 icebergs. We spend our days in rounds, or O.R., or lost, or chasing down lab slips on patients we see far too little of and often have little or no impact on their outcome (especially when we come and go so quickly). Alas, we all have to go through it. Maybe we should just be a little less hard on ourselves when we do inevitably get frustrated.

Fortunately, like a pack of clinical chameleons (evolution to lizard status!), we adapt to our rapidly changing surroundings. We develop a feel for what our role is (however redundant it may seem at times), and we learn to accept it. We learn with time to look beyond disillusionment because we can now look back. We reflect, and realize that we have learned, and probably a good deal more than we will give ourselves (or our teachers) credit for.

We learn to accept our feelings as natural and appropriate. We even realize that although most of our

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As I sit here staring at a blank computer screen, I think, there are some advantages to being an editor. Not the least of which is being able to procrastinate to absolutely the very last minute before writing. My excuse often is, well, I must type the articles that are not submitted on disc, and I can't start writing until the rest of the Journal layout has been done, so that I know how much space I have to fill (Warren, you only left me 6 column inches!). But if the truth be known, I rarely know what I am going to write about until the moment that I sit before the computer with only minutes left before press time. I have perfected procrastination as an art!

As I read over the articles in this particular issue, I am struck by the fact that this is the first issue this year where every contribution is by a medical student. Up until now, acquiring articles and drawings have been somewhat akin to pulling teeth. For most of us (first year excepted) the spring is a time that we wind down. And even for the first year class, the end is in sight. As we head off into our summer break (however short that may be for the rest of us), I would like to urge our readers to put pen to paper and write that article that you have been thinking about all year.

How well I remember at this time last year reading co-editor Warren's article on second year, "The Blur". In retrospect, I can see how accurate it was. For me, however, second year has been a somewhat unique experience. Having had a baby 2 weeks before the start of classes has put medical school into different perspective. While my classmates learned about labour and delivery, I could recall my own experiences. While others learned about the stages of infancy, I watched my daughter go through them. I learned about early human development by watching her learn how to sit, how to grasp, how to stand, and now how to vocalize and walk. I learned about otitis media in children firsthand, and worried about giardiasis while she was in daycare.

I had displaced medical student syndrome. When my small group leader in paediatrics reiterated 8 or 9 times that it should be a flag if children exhibit handedness before 24 months, I envisioned Samantha, who has shown definite right handedness for almost 3 months, at worst having a permanent neurologic deficit, at best, local nerve damage. Our instructors need to temper these little pearls by discussing the context a little bit more. The way we are sometimes taught, I think I'll end up ordering a CT whenever I see a hangnail! That is, of course if I remember anything at all from this year of information overload.

Studying? With a baby in the house studying was a whole new ballgame. When I opened a textbook, she cried. I wonder if she knows something that I don't? To preserve my sanity (and her lungs), I learned to study after she fell asleep. (Procrastination elevated to a fine art, I suspect!) Contrary to common belief, I discovered that young babies do not sleep all the time! I really discovered how much can be done when only a little bit of time is available. I like to think that it's called "efficiency". At the time, though, I think that I called it "exhaustion".

As Warren mentions in his editorial above, the passage of time blunts most of the bad times. Even though I can recall in September thinking, "How am I going to get through this year? A new baby, an exam every two weeks and no relief in sight." In retrospect I think, well it really wasn't that bad...then I kick myself in the shins! Was it worth it? Every time I come home and see the excitement on my baby's face, when she sits on the floor and tugs at my skirt, when she cuddles up in my arms and falls asleep after a long day, I think, "Well, yes it was!" ●

Connie Nasello Paterson, Meds '91

Letters...

Research freedom threatened

Dear Editors:

I am writing to ask that your readers join in opposing passage of Bill 190. This bill if passed, will prohibit the use of the so-called Draize and LD-50 tests in Ontario. This would have a number of serious, undesirable effect; ,severely hampering some types of research in Ontario.

The legislation has been vigorously supported by animal rights groups. Much of the information they have distributed suggests that this bill would only ban cosmetic testing. They also suggest that the current tests subject research animals to great amounts of stress and pain. Both positions are wrong.

As presently written, Bill 190 would ban all Draize-type testing. This type of testing cur rently includes anything (not just cosmetics) likely to be placed in or around eyes, either intentionally or accidentally. Imagine the potential effects of untested contact lens solutions, among other scenarios.

Similarly, data from LD-50 type tests is used for everything from Poison Control Center data (eg. acetaminophen levels vs. time charts) to

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Editorial (continued)

interactions with patients weren't pivotal, they were at least positive, perhaps sometimes even therapeutic. We also discover that with a little knowledge and experience comes the real enjoyment in medicine. The ability to 'manage' a problem. And with that little bit of confidence, we can look beyond the academic concerns and concentrate again on the patient - i.e. the process of becoming a doctor. The realization of these things are still a long way off for us, but our appetites have been whetted. As a classmate said, "I feel frustrated as hell as a clerk, because I see the residents and consultants enthusiastically talking about managing patients, and I can't play yet."

If medicine is a game, then we are just finishing our year as water-boys in the minor leagues, but we did learn the rules, and we've acquired some of the skills we need to play. The eye of retrospection tells us this was a good and important 'season'. Now we're ready for the next step up. Like the words to the song say, "Put me in coach, I'm ready to play...centrefield."

Warren Teel, Meds '90

Meds' Relay Madness

by Kip Millitz, Meds '91

On Saturday, April 22, over one hundred UWO Medical students took time out from their busy schedules to take part in the Annual Meds' Relay sponsored by the Hippocratic Council. The relay, now in its' ninth year, is the medical school's annual fund-raising event, with all proceeds donated to a charitable organization. The Sunshine Foundation of Canada was chosen once again as this year's charity.

The relay itself consisted of a short course through the campus and then on to the streets of London for the longer distances. With the option of running anything from 400 m. up to 2500 m. on either a competitive or non-competitive team, the relay encouraged all students to participate. Indeed, there was a broad spectrum of fitness levels represented, with some runners

And they're off...

enquiring as to the availability of ventolin puffers and oxygen stations prior to their run.

With volunteers to collect money and sponsor sheets at the starting line, and others at intersections to guide the runners through, the race soon got underway. Runners positioned themselves at the various exchange points along the course and were left to anxiously await the arrival of their classmates and to have their turn in the limelight.

At the end of the day, with all pledges tallied, the grand total raised was $3105.52 - a record-setting amount! This money will be used to send a family with a severely disabled or seriously ill child on a 5 day/4 night vacation to Disney World.

Special thanks and congratulations to Meds '92, the top money raisers, who collected a total of $1494.52. Keep up the good work! Leaving medical school in style were Meds '89, winners of the competitive run. Congratulations!

Honourable mention goes out to Meds '91, who chipped in with an impressive $964, and to Meds '90, for fielding a team in spite of their hectic clerkship schedules.

A final and sincere thanks to EVERYONE who participated in the day to help support such a worthy cause. ●

Meds '89 - Competitive Winners

Meds '92 - Money raising trophy winners

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Radiology: A Historical Perspective

By Stewart Kribs, Meds '89

Radiology has undergone enormous advancement since its birth almost one century ago. Diagnostic radiology is the specialty branch of medicine which uses radiological techniques to demonstrate pathological changes of disease. The first 75 years were dominated by improvements in the quality of radiographic equipment, film and photographic technique. Despite these advances, however, X-ray images remained essentially the same - two dimensional shadowgrams of three dimensional objects. In the 1970's, the development of computerized axial tomographic (CAT, or CT) scanners revolutionized radiology by allowing objects to be imaged in three dimensions for the first time. Today, ultrasound is a well-established procedure and the potential of MRI is just beginning to be realized. A historical review of the major radiological discoveries illustrates how influential these early developments have been on the practice of radiology today.

The most significant event in the history of radiology which led to the birth of the profession was the discovery of X-rays in 1895 by William Roentgen. In the late 1800's, physics and chemistry were the focus of scientific research. Notable advances were being made by scientists including Faraday, Boltzmann and Hertz. One area of research involved the study of cathode rays (streams of electrons generated from a negatively charged source - "the cathode") in a vacuum tube. Roentgen, a brilliant German physicist born in 1845, began experimenting with cathode rays in 1894. Previous researchers had found that cathode rays (streams of electrons) were able to penetrate thin metal foil "windows" in glass vacuum tubes and propagate a few centimeters into free air. Roentgen wanted to know whether these cathode rays (electrons) could penetrate through the glass wall of the vacuum tube. It was this question which led Roentgen to make one of the greatest discoveries of the nineteenth century.

On the evening of November 8, 1895, Roentgen was experimenting with his cathode ray discharge apparatus. (This consisted of a cathode element fixed inside a sealed glass vacuum tube.) While attempting to detect cathode rays outside of the apparatus using a screen which would fluoresce in the presence of these rays, Roentgen noticed a spare screen glowing far away from the apparatus. Since he knew that cathode rays dissipated within centimeters from the tube, he concluded that the glowing screen must have resulted from a new type of ray which "radiated" from the discharge apparatus. Within a few weeks, Roentgen determined that these "new kinds of rays" were generated from the cathode rays as they struck the glass wall of the discharge apparatus. These rays could travel considerable distance (several orders of magnitude greater than cathode rays) and could transmit through paper, books, wood and metal. Considering their mysterious properties, Roentgen gave them a now famous, time-honoured term - "X-rays".

World response to Roentgen's breakthrough was unprecedented. Within one month of his discovery, Roentgen was asked to demonstrate his experiments to the German Emperor in Berlin, and his findings were independently confirmed all over the world. (It is interesting to note that the recent discovery of "cold" nuclear fusion by two chemists named Pons and Fleischmann is achieving similar instant recognition.) In less than a year, over one thousand articles were published in the field of radiation physics. The significance of Roentgen's discovery was profound. Based on X-ray experiments, researchers defined the properties of electrons and atoms and developed the quantum theory of mechanics. Einstein took radiation physics one step further and proposed the General Theory of Relativity. Ultimately, the entire field of nuclear physics began with Roentgen's accidental discovery of a "new kind of ray".

The discovery of X-rays proved to be an equally important scientific advance in medicine. In addition to paper, wood, and metal, Roentgen observed that X-rays could penetrate the human hand and leave a shadow of the bones on the fluorescent screen. In a wave of scientific furor, researchers began investigating the clinical application of X-rays. Their obvious ability to demonstrate fractures in bones or metallic foreign objects (especially bullets) in soft tissues quickly became apparent. One of the earliest patients to be diagnosed using X-rays was a female ballet dancer in England who had been treated for a septic foot unsuccessfully for months. An X-ray in January, 1896 (three months after Roentgen's original description) detected a needle in her foot which was removed, and the patient returned to the stage. One month later, both the Lancet and the British Medical Journal published X-ray photographs. The BMJ wrote "the application of [X-rays] to the photography of hidden structures is a sensational feat".

In the United States, news of Roentgen's breakthrough began an epidemic of "Roentgen fever" in the American scientific community. Researchers at Yale University beat their adversaries at Harvard by one day in producing the first American radiograph. The first clinical radiograph was performed at Dartmouth University and demonstrated a Colles' fracture in a patient's injured arm. Even the famous inventor Thomas Edison was drawn into X-ray research; on February 5, 1896 Edison was asked by William Randolph Hearst, publisher of the New York Journal, to make a "cathodograph [radiograph] of a human brain". (Despite an amazing one hour exposure of his assistant's head to the X-ray apparatus, Edison only achieved a picture of "curvilinear murkiness"; he concluded that any subsequent attempt would be "futile as the bony structure of the cranium would offer an insuperable obstacle".) Kidney stones and gallstones were demonstrated in the fall of 1896. Within a year, Roentgenology (the study of X-rays) had become permanently established in the practice of medicine.

The impact of Roentgen's discovery on both the scientific and medical community led to a universal acceptance of the benefits of X-rays. The harmful effects of X-ray irradiation were much slower to be recognized. Early X-ray photographers did not shield themselves from their X-ray apparatus. Within months of Roentgen's first publication of X-rays, burns to the hands of X-ray workers were being reported. (Although the dose of radiation Roentgen received was not known, he apparently enjoyed relatively good health until his death in 1923. It is possible that he was protected during his experiments by chance because he worked in a large metal cage which blocked the light from the discharge apparatus from interfering with his luminescence detectors.) In late 1896, scientific thinking was sharply divided regarding the source of the injurious effects. One famous investigator, Nikola Tesla, asserted that X-ray associated dermatitis was not caused by X-ray exposure but instead resulted from repeated local electrical burns when working in close proximity to an X-ray tube.

With such influential voices proclaiming X-rays harmless, some researchers continued their work despite early warning signals of impending doom. A glassworker employed by Thomas Edison named Clarence Dally became the first American casualty. Dally worked in Edison's laboratory standardizing X-ray devices with his bare hands. Although he incurred severe burns to his hands after only a few months in the laboratory, he insisted on continuing his work. Dally died in 1904 from metastatic squamous cell carcinoma despite 144 failed skin grafts and bilateral arm amputations. Dally's death illustrates the importance of maintaining a vigilance for the potential detriments of new technology.

Other scientists were expressing grave concern for the possible adverse effects of X-rays. In 1901, a Boston physician named William Rollins demonstrated that a guinea pig in a closed, electrically insulated box could be killed by X-rays. (His work was appropriately titled "X-light kills".) Equally important, Rollins observed that the guinea pig died with no visible burns. He concluded that a lack of skin damage does not indicate that a given level of X-ray exposure is safe. These results were strongly reinforced on both sides of the Atlantic by a paper published in the Italian literature in 1916 titled "Autopsy of a Radiologist". The demise of a radiologist named Emilio Tiraboschi who had been practicing radiology for fourteen years without protection was detailed. His autopsy showed profound aplastic anemia (and testes shrunk to the size of "filbert nuts") which revealed the systemic effects of prolonged X-ray exposure. Researchers concluded that when performing X-ray examinations, the smallest possible beam should strike the patient, and no rays should strike the observer. This important axiom continues to be stressed to X-ray personnel today.

As interest in the field of radiology rapidly disseminated, many individuals began seeking the potential applications of X-rays to medical practice. Most individuals were honest physicians with sound medical intentions. Reports

of others with unscrupulous backgrounds trying to defraud the public with unfounded claims began casting doubt on the legitimacy of X-ray diagnosis. The pioneering radiologists were asked to address these concerns, and they established the Roentgen Ray Society in London, England in 1897. The purpose of the society was to identify those qualified to use X-rays, to establish standards of training and expertise, and "to set those so qualified apart from unprincipled pretenders and charlatans". The Society was renamed the British Institute of Radiology in honour of the Queen, and its journal had continued as the British Journal of Radiology.

By the turn of the century, X-rays were showing great promise in diagnosing many medical disorders. The challenge in radiology was trying to earn professional respect and recognition. At that time, radiologists were viewed as inquisitive, invisible-light photographers who had abandoned their clinical duties in order to search for hidden shadows in the pictures they produced. Dr. George C. Johnston, president of the American Roentgen Ray Society in 1909, stated that the work of the radiologist was "being appreciated by about one physician in three-hundred and fifty". In an attempt to upgrade the profession, one prominent radiologist named Pancoast (best known for his description of the Pancoast tumour syndrome) outlined four essential qualifications of a roentgenologist. He stated that a roentgenologist must be a "specially trained physician" who had obtained "suitable practical experience through training as an assistant". The radiologist should have a "thorough theoretical knowledge of photography and physics", and take every possible precaution to protect patients, other workers and themselves from the "unnecessary evil of X-ray exposure". Today the words of Pancoast are echoed throughout the profession and his ideas formed the foundation for radiology residency training programs.

From the turn of the century to the present, the history of radiology has been characterized by a lengthy list of impressive technological advancements. Until the introduction of computers and CT in the 1970's, radiologists were able to keep pace with their expanding profession. The introduction of "high technology" radiology including CT, digital subtraction, Doppler/ultrasound and MRI has led to an explosion of new information. Even the most dedicated general radiologists have been forced to narrow their imaging expertise. Radiologists have accepted these challenges. Their interest, flexibility and dedication throughout the history of the profession have enabled diagnostic radiology to keep its central position in medicine. ●

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Letters (continued)

monitoring water pollution. If Bill 190 passed, water-quality monitoring in this province would be immediately and severely hampered.

Proponents of the Bill use emotionally-effective photos, such as severely damaged eyes of rabbits, to make their point. However, the tests have been greatly modified since their initial use. Current protocols have minimal effects on research animals.

Of particular concern is the politicians' tendency to respond only to what they think the public wants. Thousands of people have written to support Bill 190, while researchers and other knowledgeable persons have been relatively silent.

If the medical community does not respond to threats against good science, such as Bill 190, we may one day awaken to find our hands have been legally tied. We will not be permitted to do sound and needed research. Only by opposing such bills can we preserve our ability to do important research. I urge readers of the Medical Journal to write the Premier, their MPP, and other politicians to oppose Bill 190.

Allan Garbutt, Meds '91

Why Ethics?

By Allan Garbutt, Meds '91

"Good ethics is good medicine."

That statement was made at a recent conference, held at Western, on teaching medical ethics to undergraduate students. Like most aphorisms, it probably oversimplifies the situation, but there is a very large element of truth to it.

The comment answers the question posed in the title of this article, while also providing the reason for it. Most undergraduate medical students at Western will have realized by now that there are only a few hours of classroom time devoted to ethical issues. The instruction provided is tightly constrained by the need to complete the lectures in a relatively short time, and to cover a wide range of topics at least briefly.

A further problem with the present ethics presentations is that most of them involve only medical students and doctors. In real life, medical-ethical questions will involve people from a variety of backgrounds. Nurses, social workers, occupational therapists, physiotherapists, and the patient/family will be involved, along with the physician(s).

While most students know there are a large number of potential ethical problems in the practice of medicine, relatively few have opportunities to seriously discuss any such problems at length with knowledgeable persons. As a result, many of today's students are likely to have their first serious encounter with ethical issues in a clinical setting. That situation, with its frequent need for quick answers, is probably not the best place in which to review a range of options and make decisions that may have far-reaching implications. It would be preferable to debate at least some issues in a more relaxed atmosphere, where there is time to thoroughly discuss and review all the options and their implications. Such a background should make it much easier to reach the appropriate decisions when necessary.

To help overcome some of these problems, a group of students is organizing an interdisciplinary ethics discussion group. It will begin next fall, and will involve students from all the Health Science faculties. Clinicians and other medical personnel with expertise in the areas being discussed will be asked to participate and assist with specific topics at the regular meetings. While the group is aimed specifically at students, anyone who wishes to participate will be more than welcome.

The steering committee has selected topics in a variety of areas for the initial meetings next fall. The first meeting, on September 19, will discuss the topic "Who is Involved in Do Not Resuscitate Orders?". One of the discussion leaders will be Dr. F. Rutledge of the Critical Care Trauma Unit at Victoria Hospital. The committee is currently working on the details, from recruiting additional experts to booking a room and arranging for refreshments. At the same time, they are planning all aspects of the other meetings set for next year. Those meetings will be held in the late afternoon of the third Tuesday in the month.A complete agenda will be available next September. The individual meetings will be widely publicized in the Health Science classes. We hope to see as many Nurses, Meds, Dents and Allied Health Science students at them as possible. ●

CPPNW Active in London

by Les Wasilewski & Carolyn Meyer, Meds '92

The London chapter of the Canadian Physicians for the Prevention of Nuclear War (CPPNW) held a gala evening, Friday, April 28, at the London Regional Art Gallery. The evening was planned to give a preview display of the student art projects entered in the city-wide high school "Healing Our Planet" contest. Each entrant was required to use a story, poem, poster, video or other medium to identify a problem or crisis in the world and offer a possible solution.

An excellent 7 course meal was provided by Sebastian's, and was followed by a talk from Dr. John Polanyi, Nobel Laureate in Chemistry, and founding member of the Canadian Pugwash Committee. Dr. Polanyi's speech, entitled "A Sense of Hope: Today's Reordering of Priorities" was both informative and challenging, shedding light on the new era of co-operation between the super-powers, yet exposing the dangers still present in the current SDI (Star Wars) program being developed by the current U.S. administration.

The next morning, the judging of the entries took place, and Dr. Polanyi was present to give a talk to the students, as well as to present the winning entrant and runners-up with their prizes. This year's winner was sponsored by the London CPPNW on a week long trip to the United Nations in New York.

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As many as 3000 London and area primary school cdhildren are taking part in the International Peace Lanterns Exchange Program sponsored by the London CPPNW. This is the first year that London has taken part in the project, and we will be joining cities in over 125 countries, including Japan, the U.S., Germany, and the Soviet Union. Several Western medical students have joined London area physicians and other health professionals in promoting the project by acting as emissaries to local schools.

Colourful candle-lit lanterns bearing the children's personal messages of peace will be set afloat at the Forks of the Thames on August 5, 1989 to symbolize their commitment to world peace. The London Canoe Club will be on hand to collect the lanterns downriver.

Some of the paper lanterns that the children make will be sent to other countries to be floated. On the Thames will float lanterns from the U.S., Japan and the Soviet Union. In this manner, each child is paired with a 'pen twin' to whom they send a personal wish of safety and peace.

The ceremony itself will take place in Harris Park on August 5, with the lanterns placed in the water at dusk. We hope that if you are in town that you will come and join the ceremony, and help us put the lanterns together, starting at 5 p.m. If you are interested in helping, or would like more information, please contact Ana Thompson, 667-4806.

Why take part in this project, you ask? Because, "It is better to light one candle than forever curse the darkness". ●

Lead by the offensive firepower of Steve Hoey, Ted Tweedie and Dave Ohrling (household names by now), the men of '90 skated to a stunning vengeance championship in the Meds hockey playoff. Picture perfect plays paired with a proliferation of pucks pelting petrified Post-grads produced a pleasant 13-1 pounding in the semi-final. In the final, spectators witnessed what some have called "the hockey classic of the century", as Meds '90 defied the oddsmakers and handed '91 a 4-1 drubbing for the victory. The conquering clerks consequently caroused with congenial comraderie, culminating in kicking clothing carelessly. Congrats!

PBL - A Place at Western???

by Paul Kursell, Meds '91

Problem-based learning, or PBL as it is more affectionately known, is a new and innovative approach to education recently being implemented into the curriculum of the Medical School at the University of Western Ontario. To most of us in the faculty of Medicine, PBL was, until recently, an unknown acronym or something dreaded and horrifying. It was looked upon as a method of instruction so off the wall that only a medical school such as McMaster would attempt to use it as a means of teaching. Problem-based learning was so foreign to both students and faculty that it felt threatening to even entertain the idea. I mean, why should we tamper with a form of education that has consistently proven itself and has stood the test of time? What is wrong with sitting in a classroom for hours at a time being lectured to by an expert in the field? Is this not the best form of teaching? Is this not what the students and faculty are used to and is it not what they expect? Maybe not anymore.

PBL takes both the students and the faculty away from the didactic lecture setting in which the lecturer speaks and the student writes, rarely stopping to think about what has been said. Instead, PBL breaks up the class into groups of approximately 8 students and each group is assigned its own facilitator/tutor - NOT lecturer. The 9 group members then meet in a smaller room to discuss clinical cases that are designed to generate thought and discussion amongst the group members.

I'm sure at this point that all of you skeptics are now nodding your heads and saying to yourselves, "See, I told you. PBL is nothing more than a group discussion and an utter waste of my time. How could I possibly learn anything or teach anything in such an undirected, unorganized setting?" These were the same thoughts that clouded my head before I became involved with the PBL programme. However, after having been exposed to PBL both in faculty training sessions and in actual practice, my opinions have drastically changed. PBL is not just a welcome change from the stuffy confines of UH-B or DS1002, it is much, much more.

PBL is defined as "the learning which results from the process of working towards the understanding or resolution of a problem" (Barrow, H.S. and Tamblyn, R.M., Problem-Based Learning - An Approach to Medical Education, Springer Publishing, New York, 1980). Students get together in groups of 8 or so students to discuss a clinical situation. Contrary to popular belief, PBL is not just another form of focal problem. Instead of attacking an idealized case with the goal of formulating a differential diagnosis and an approach to management, PBL's approach is to stimulate students to THINK about the clinical problem they have been given, formulate a list of learning objectives introduced by the case, and then in a student-directed, self-motivated manner, obtain the knowledge necessary to meet the learning objectives identified by the group. PBL sessions do not allow students to simply regurgitate what was fired at them in rapid sequence during a lecture. Rather, this innovative method of instruction encourages students to actively participate in their own education, decide how they wish to spend their time learning what they believe to be important.

But how does a first or second year medical student know what is important? They are just beginning to get a grasp on the vast universe of medicine. How could a student possibly decide on his or her own what should or should not be learned? Won't important points be missed, skimmed over or ignored completely? I don't think so. Each PBL case is designed to raise certain issues that the student must identify as learning objectives. If the group of students miss or choose to ignore a certain area - say the biophysical properties and principles of a normal synovial joint - it is the job of the facilitator to point out to the students that in order to fully comprehend what is clinically wrong with the knee and how best to treat a damaged anterior cruciate ligament, a fundamental knowledge of structure and function is absolutely essential. The facilitator is **any** faculty member who has had proper PBL training and has at his or her disposal a description of the learning objectives intended by the authors of the PBL cases. The facilitator does not, however, surrender these learning objectives freely. In most instances, the students themselves are able to identify what they need to know, either at the onset of the case discussion, or when they are acquiring the knowledge that they decided was needed to better understand the case.

After having researched their learning objectives, either individually or as a whole, the group meets again to share and discuss the information that they have obtained. No, it does not then have to become a series of mini-lectures on "what I learned in the library" unless that is what the group decided to do. Instead, most groups simply go around the table sharing ideas, trying to answer each other's questions, and discussing in a thought-provoking manner various aspects of medical knowledge and application. It is often at this second session that in trying to explain concepts to one another that students identify areas of deficit. Just try to explain to someone why arthritic joints "gel" without an understanding of the viscous properties of synovial fluid. It is next to impossible. However, if the students in the group continue to miss a fundamental learning objective, then it becomes the responsibility of the facilitator to get the students back onto the right track, so that important points are not missed. The facilitator does not give the students the answers that they are lacking, instead the group facilitator merely encourages the students to think about certain issues that they have overlooked, or of which they do not seem to have a basic understanding. Phrases such as "This is the answer/reason according to..." are no longer a part of the faculty member's vocabulary. Instead, phrases such as "what about...? How do you explain...? Could you tell me why...?" are used instead. This type of student-faculty interaction is such a welcome change from the unidirectional bombardment that occurs in the lecture setting. Gone is the "I speak, you write" approach. Instead, students and faculty can share ideas and knowledge, learn from each other, and interact in a very co-operative, productive and enjoyable fashion.

But how can PBL possibly cover all of the material present in medicine today? And how will it be able to keep up with the ever-expanding sea of knowledge that often-times becomes so easy for students (and faculty) to flounder in. PBL is not designed to teach the students the picky details, nor is it intended to replace the lecture setting completely. Its prime objective is to provide an environment in which students can learn general concepts that can be applied to a wide variety of clinical situations. By learning this fundamental knowledge it then should become much easier to acquire new ideas in detail (in lectures and in practice) as they pertain to a rapidly changing field. "PBL is a way of learning which encourages real understanding of the material rather than a superficial coverage (Weston, W.W., Introducing problem-based learning into the ICC course, UWO, 1989).

In summary, PBL serves the following functions: It allows students to recognize their own areas of strength and weakness with respect to medical knowledge. It allows students to decide best how to learn the material that they need to know. PBL encourages students to explore new resources such as the library, articles, journals, CBLC, clinicians, etc. PBL helps to teach students and faculty to co-operate and function productively within a group. And lastly, PBL helps the students and faculty develop skills that will allow them to tackle any problem presented to them, either individually or in a group, and how to think about and solve the clinical situation in a very productive manner.

PBL is a very new and innovative approach to education, but it is still somewhat of a mystery to many within the faculty of Medicine. In order to completely understand the full benefits of PBL to both the students and faculty members, it must be experienced. The success of the PBL programme will require the continued participation and co-operation of **BOTH** the students and faculty. PBL **will** become a very important part of the curriculum in the faculty of Medicine here at Western, as it is at several other medical schools in both the U.S. and Canada. PBL can become an excellent means of complementing the didactic lectures that presently consume first and second year medical students, as well as helping students to develop the interpersonal skills that will be absolutely invaluable in the practice of medicine. In order for PBL to function effectively and to its full potential at Western, it will require an objective approach from both students and faculty members. PBL will require a continuous flow of participation and ideas so that it can evolve into a component of medical education that will be enjoyable and invaluable to all who practice medicine.

PBL - a place at Western? You'd better believe it! ●

YEAR IN

REVIEW

Diagnosis of Pneumocystis Carinii Pneumonia

by Leslie Vanderburgh, Meds '91

Pneumocystis Carinii Pneumonia (PCP) is a disease of the compromised host, which occurs in two settings:

1) Epidemic illness among premature or debilitated infants;
2) Sporadic illness among immunocompromised children/adults.

PCP is a fatal illness if left untreated.[1]

Pneumocystis carinii is a protozoan. There are three major forms which include a trophozoite, sporozoite and a cyst. Mature cysts are thick-walled and contain up to eight sporozoites. Some cysts are crescent-shaped because of incomplete development or encystment of some of the sporozoites, resulting a partial collapse of the cyst. Following release, the sporozoites develop into mature trophozoites containing mitochondria, a nucleus, and endoplasmic reticulum. They appear to be eukaryotes. Trophozoites attach to host cells by pseudopodal extensions through which they can obtain nutrients. Following this, the host cell degenerates.

Serologic studies show that up to 75% of children develop detectable antibodies by 2-4 years of age. This suggests that diseases due to pneumocystis carinii may be rare, but infection is very common.

Virtually all cases of PCP in the United States and Canada occur in immunocompromised patients. The most comon presenting symptom of AIDS is PCP, occurring in approximately 50% of cases.[2]

The normal immune response to P. carinii is not known. However, PCP is usually associated with dysfunction of the cellular immune system. More recently, it has been suggested that antibodies are important in opsonization and phagocytosis of the organism by macrophages.

Other causes of pneumonia, including viral, bacterial, and fungal agents, may co-exist with PCP. Combined infection with cytomegalovirus is especially common after organ transplantation, which may be due to either the coincidence of two common infections in these groups or to an immuno-suppressive effect of the CMV infection itself.[3]

Pathological findings vary depending on the ability of the host to mount an inflammatory response. Classically, there is a foamy intra-alveolar exudate consisting of masses of cysts and desquamated alveolar cells, and an interstitial infiltrate of plasma cells and lymphocytes. A polymorphonuclear leukocyte alveolar infiltrate is rare in the absence of a concomitant bacterial infection. Lymphocytes are predominant, and plasma cells are rare.

Special stains are needed to demonstrate the organism in tissues or secretions. These include methenamine silver, toludine blue O (TBO), as well as Giemsa and Gram-Weigert. The use of these special stains for P. carinii is usually by surgical pathology rather than microbiology laboratories due to the nature of the specimens submitted and the complexity of the stains.

PCP in AIDS patients is often characterized by a number of organisms present in their secretions. Methenamine silver, TBO and Gram-Weigert stain the cyst walls, leaving the trophozoites and internal sporozoites unstained. Giemsa stains detect the internal sporozoites and trophozoites, but leave the cyst walls unstained. A disadvantage of both the Gram-Weigert and Giemsa stains is that the tissue cells and other debris are also stained, and substantial expertise is required to read them accurately. All of these special stains are non-specific, such that P. carinii must be distinguished from yeasts and other structures based on morphology.

Kovacs and colleagues[6] showed an improved detection of P. carinii in sputum with the use of monoclonal antibodies. In this study, they prospectively studied the sputum of 63 patients, 49 of whom were ultimately given the diagnosis of P. carinii. The sensitivities of the three stains used in this study were 45/49 (92%) for immunofluorescence (IFA), 37/49 (76%) for Giemsa stain and 39/49 (80%) for TBO. There were no false positive immunofluorescent stains. IFA was found to be statistically more sensitive than Giemsa stain ($p< 0.008$) and TBO ($p<0.007$). They also pointed out that IFA had no false positives, and was the quickest to perform, taking 5-15 minutes. Giemsa stain and TBO took 5-30 and 5-20 minutes respectively to perform.

Gill and colleagues[4] completed a similar study correlating the sensitivities of IFA and TBO. They used a combination of three monoclonal antibodies, two prepared against human and one against rat P. carinii, in an indirect fluorescent antibody stain in both bronchoalveolar lavage and lung biopsy specimens. This combination of monoclonal antibodies was specific for P. carinii and showed fluorescence of both P. carinii cysts and trophozoites. The IFA and TBO showed a 97.6% agreement. They concluded that IFA was a fast, simple and sensitive method for diagnosing P. carinii.

For lung biopsies, Gay and co-workers[5] found that concentrated preparations contained a significantly greater number of cysts when compared to impressions prepared by imprinted open lung biopsy specimens ($p<0.001$). In this study all specimens were stained with methenamine silver.

Pneumocystis infection is usually manifested in immunocompromised patients by the subacute development of a non-productive cough and dyspnea which occurs over a period of days. Fever often accompanies PCP. Physical findings are usually minimal or absent. Cyanosis and crackles are the most frequently reported physical signs. Evidence of other opportunistic infections may be present, i.e. oral thrush, hairy leukoplakia.[2,7,8]

The classic early radiologic finding is a hazy perihilar infiltrate spreading to the periphery and appearing predominantly interstitial. The diffuse alveolar nature of the process becomes evident as the infiltrate coalesces and air bronchograms develop.[7,8] In some patients, cystic changes or pneumatoceles have been noted, particularly during the healing process. Unusual roentgenographic findings include pleural effusions and hilar adenopathy. These findings should suggest a different disease.[9]

Approximately 5-10% of patients with AIDS who are proven to have PCP have normal chest radiographs.[10] Other pathogens such as CMV and mycobacterium tuberculosis may also be present without causing abnormal chest radiographs. Other studies have found a much higher percentage of normal chest radiographs. Woolfenden[11] found 18% of chest radiographs were normal with proven PCP. However, one of the most important reasons to do a chest radiograph is to rule out another pathologic process.

Gallium scanning is a more sensitive test for P. carinii when compared to chest radiographs. Imaging of the lungs is performed 48-72 hours after injecting the patient with 5-7 m.c.i. of 67-Gallium labelled citrate. Typically, in patients with P. carinii, there is a diffuse uptake of gallium throughout the lung parenchyma. Uptake is also present in subclinical infections (i.e. normal arterial pO_2 values, chest radiogrph, or both) and has a 100% sensitivity to P. carinii.[12,13]

Colman and colleagues[13] tried to determine both the sensitivity and specificity of gallium scans in diagnosing PCP. Correlations between the bronchoscope results and gallium scan findings were made using two scoring methods; a simple system (normal vs. abnormal) and a graded score (1 to 4). All patients positive for PCP by biopsy had abnormal gallium scans by both interpretations (100% sensitivity). In this study, ten patients did not have PCP. The gallium scan of these patients was read as abnormal in 8 using the simple system (20% specificity) and as abnormal in only one patient using the grading system (90% specificity). They concluded that the graded scoring system improves specificity, and an abnormal gallium scan (3 or more) should be highly suspicious of PCP (grade 3 being abnormal localization equivalent to hepatic uptake).

For patients who have had previous episodes of PCP, gallium scanning may be useful in detecting relapses. Woolfenden et. al.[11] found that GA-67 uptake was less following initiation of treatment.

The diagnosis of PCP requires the morphological demonstration of the organism in tissues or secretions. Although patients with PCP often complain of a cough, they rarely produce sputum unless a secondary infection is present. Adequate specimens can be obtained by having the patient inhale an aerosol of hypertonic saline produced by an ultrasonic nebulizer. Both Pitchenik and colleages[14], and Bigby and co-workers[15] have documented that examination of the sputum identifies P. Carinii in 50-60% of patients. Bigby subsequently reported a large study at San Francisco General Hospital, which showed the sputum examination to have a 79% sensitivity with a negative predictive value of 61%.

To achieve this level of sensitivity, the induction of sputum, processing, and examination of the sputum must be done with great care. In this study the patients did not eat for several hours prior to the induction. The patients carefully cleansed their teeth, gums and oral cavity by brushing and gargling. After the specimen was produced, it was transported to the lab within 30 minutes. The yield from the specimen may be increased by using a mucolytic digestion and centrifugation to concentrate the specimen. Staining in these sputum samples can be done by Giemsa, or cyst wall stains such as methenamine silver or by fluorescence-conjugated monclonal antibody.

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Traditionally, the most reliable means of diagnosis has been the open lung biopsy. This requires intubation, general anesthesia and commonly a chest tube. However, it allows visualization and sampling of involved areas of lung and direct control of intraoperative bleeding. In experienced hands the complication rate with this procedure is low even in seriously ill patients. As mentioned above, examination of P. carinii in imprints and tissue sections can be done, concentrates being significantly more sensitive.

With more benign procedures available, open lung biopsy for diagnosis should be reserved for several uncommon situations: 1) pulmonary disease in a patient for whom sputum induction and fiberoptic bronchoscopy with bronchoalveolar lavage has been non-diagnostic; 2) a patient who has an uncorrectable coagulopathy and in whom lavage has been non-diagnostic; or 3) a patient who requires mechanical ventilation and in whom biopsy and/or lavage has been non-diagnostic. Even in these situations, a second bronchoscopic procedure may be indicated before open lung biopsy.[16,17]

Bronchoalveolar lavage (BAL) and transbronchial lung biopsy (TBB) have proven to be sensitive techniques for identifying pulmonary infections in patients who are immunocompromised.[19,20,21] Fiberoptic bronchoscopy with BAL and TBB can be performed under local anesthetic by using a transoral or less commonly, a transnasal approach. Unless there is a focal abnormality on the chest radiograph, the procedure can be done without fluoroscopic guidance. The bronchoscopic procedure should include inspection of the hypopharynx, vocal cords, and airway from the trachea to the subsegmental bronchi, looking for the characteristic lesions of Kaposi's sarcoma. Endobronchial lesions, including mycobactera or fungi may also be seen.

After inspection of the airways, the bronchoscope is wedged into a peripheral airway, most commonly in the right middle lobe. Approximately 100 ml of sterile saline is instilled in 20 ml aliquots. Suction is used following each bolus. The aspirated return is approximately 50 ml. BAL can be performed using a fiberoptic catheter or a double-lumen, balloon-tipped catheter. Neither of these requires bronchoscopy. The lavage specimen should be centrifuged, and the sediment smeared and stained for P. carinii, mycobacteria, and fungi. Mycobacterial and fungal cultures should be performed as well.

If a TBB is to be performed it should be done after the lavage. When there is diffuse lung disease, the biopsy specimens are generally taken from the right lower lobe. If a radiograph abnormality is localized, the biopsy specimens should be taken in the area of greatest abnormality with fluoroscopic guidance. Multiple specimens are normally obtained. Specimens for microbiological examination should be placed on moistened gauze sponge and transported in a capped jar. Specimens for histological study should be placed in formalin. The complications of TBB include hemorrhage and pneumothorax. Broaddus et. al.[22] described pneumothorax occurring in 9% of their patients, with 5.9% of them requiring chest tube placement. There were no deaths and no hemoptysis occurred in this series of 253 patients. Absolute contraindication to TBB includes an uncorrectable coagulopathy. Respiratory failure severe enough to require mechanical ventilation is a relative contraindication to TBB. BAL can be safely performed in both of these situations.

Stover reported the results of bronchoscopic procedures in 72 patients with AIDS.[19,23] Both TBB and BAL had a high degree of sensitivity (88% and 85% respectively). When combined, the sensitivity rose to 94%. The yield of the two procedures was especially high for P. carinii at 94%.

Broaddus et. al.[22] had similar results. They reported the efficacy of BAL and TBB in a series of 276 fiberoptic examinations performed on 171 patients with known or suspected AIDS. BAL and TBB had sensitivities of 86% and 87% respectively. For P. carinii, BAL had a sensitivity of 89% and TBB had a sensitivity of 97%. For patients who had both procedures (BAL and TBB) the sensitivity was 100%.

Golden et.al.[20] used BAL alone. They reported that BAL detected PCP in 36 of 37 patients, for a sensitivity of 97%. The sensitivi-

ty for other pathogens such as cryptococcus and mycobacteria avium-introcellulare is much less.

Ognibene et. al.[21] assessed the sensitivity of BAL in patients with proven PCP. These investigators found that in patients whose conditions were worsening while receiving treatment for PCP, repeat bronchoscopies showed only P. carinii. They concluded that in patients with AIDS who have persistent of worsening pulmonary infiltrates despite therapy, repeat bronchoscopy after a short interval was unlikely to have any benefit. In contrast, they found that patients whose pulmonary involvement initially resolved may benefit from an aggressive diagnostic approach if new pulmonary infiltrates appeared. In their study, new treatable diseases were found in 59% (27 of 46) if bronchoscopy was repeated greater than thirty days after the initial bronchoscopy. This improved the short-term survival rate.

The prognosis from sporadic P. carinii pneumonia in immunocompromised hosts is serious, and mortality rates are 90-100% without treatment. Even with the available treatment of effective chemotherapy, 20-40% of patients will die, and delays in diagnosis may contribute to their mortality. ●

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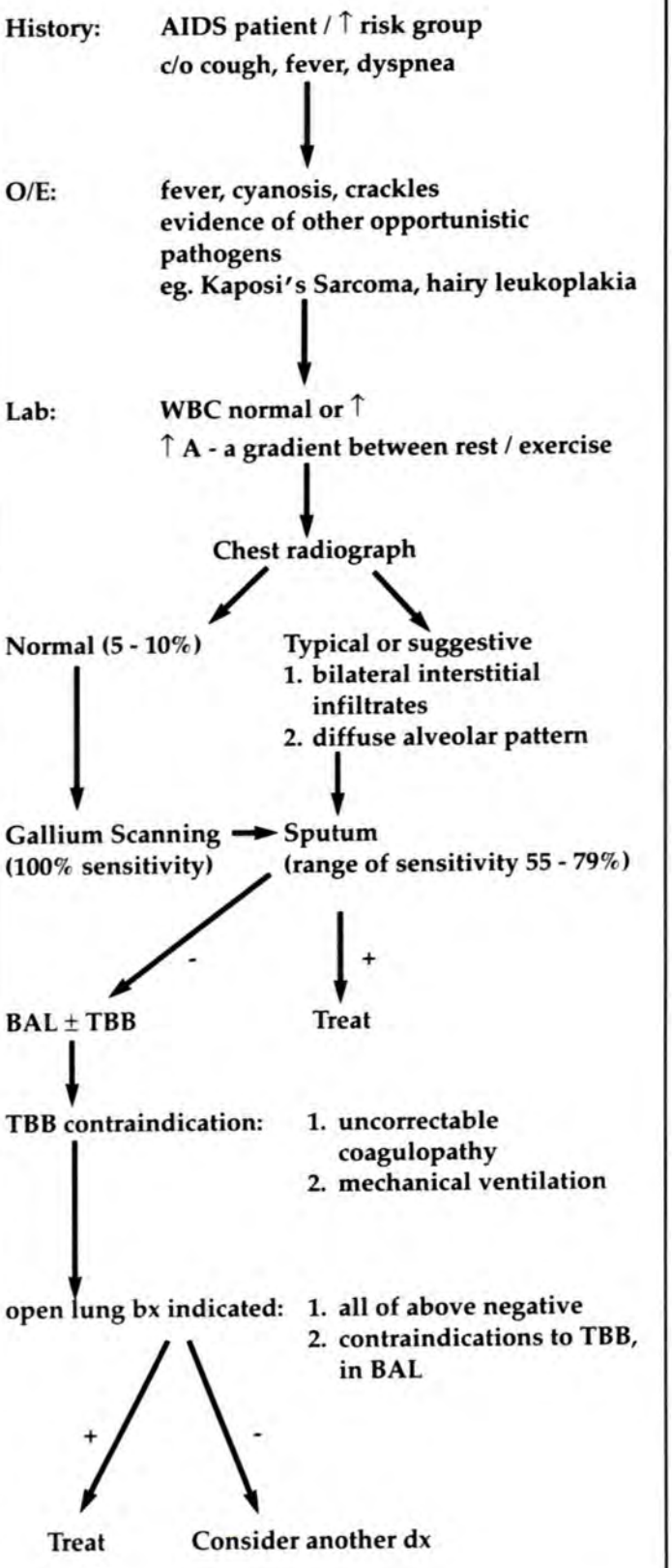
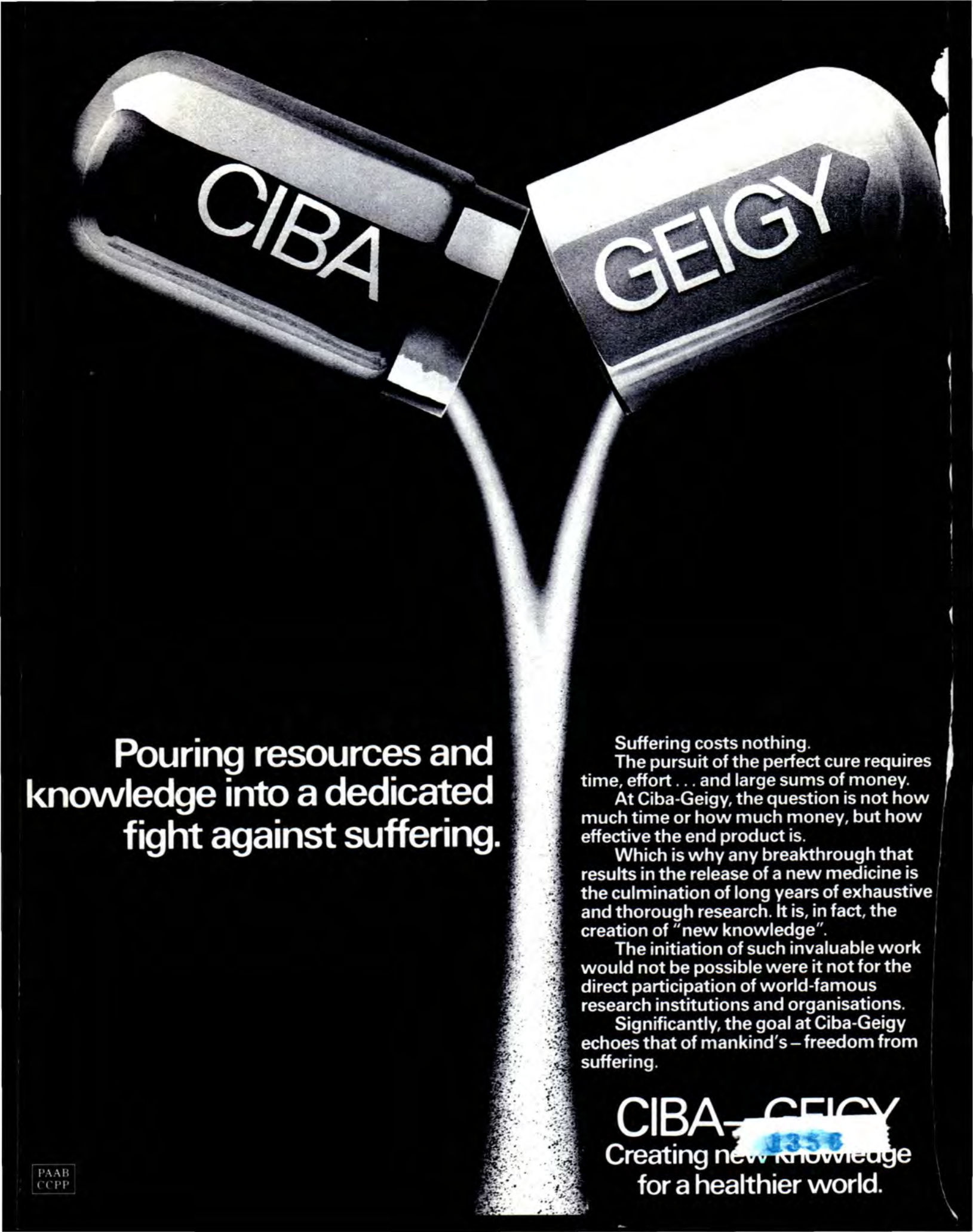
PCP Dx SUMMARY



SWAN SONG

To celebrate the departure of Tom Song, Meds '89, we have dedicated this page to our most prolific cartoonist. His own unique brand of humour has kept us "In Stiches" during his 4 years at Western. Farewell and good luck!



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