hospital, Honolulu, the territory has since then borne the complete expense of caring for leprous persons in its jurisdiction. None of the territory leper patients have been cared for in the leper colony at Carville, La., the establishment of which was provided for by an act of Congress in 1917. The Kalihi station, known as the U. S. Leprosy Investigation Station, is administered by the Public Health Service.

DISCUSSION

SHOULD SCIENTIFIC DISCOVERIES BE PATENTED?

IT is becoming increasingly common for investigators in various fields to apply for patents on materials, processes or apparatus which have resulted from their work. Certainly in most cases this has been done without any desire to obtain personal reward from the sale of patent rights or the income from royalties. Within the last few years there have been established impersonal organizations to hold these patents, such as the Insulin Committee at the University of Toronto and the Wisconsin Alumni Research Foundation. The benefits from such legal control of discoveries have been made available to many investigators in the institutions where such organized control has been provided.

When informal groups of men gather at the various conventions of American scientific investigators, the advisability of the patent method of control is being debated with considerable frequency. Although this is not unusual, it is unfortunate that emotional reactions are beginning to appear in this discussion, and there is present the material out of which serious jealousies are almost certain to appear. No discovery in science is made by an individual unaided by the enormous background of science in general. Consequently, it is debatable whether one man should have credit for the climax of a long series of studies which come to recognized fruition in his hands. The nearly simultaneous discoveries of the same fact are only too frequently disappointing for one of those involved. Just apportionment of credit will remain difficult. Patents may serve to give legal intrenchment to rights which are not permanently and justly tenable. The feelings of many men who are engaged in scientific research are beginning to be aroused on these questions. It is to be hoped that they will not be allowed to reach a point where there is any spoiling of the fine camaraderie which has characterized American laboratories and science meetings.

If an attitude of suspicion and jealousy should develop in this country between the scientific men of our numerous institutions, it would be very apt to lead to the throwing of a cloak of secrecy about all work of interest. It is obvious that this would hamper progress in research and in teaching, as well as in practical applications of science. Certainly no one desires such an outcome of the rivalry in investigation, which is now for the most part a good-natured and open race. When patents are commonly resorted to, both those who do apply for them and those who prefer not to will feel that secrecy is necessary.

Of course there are advantages to the use of the patent. The public is thereby protected against certain ruinous types of exploitation. Assurance can be gained that technical processes are used in dependable ways. Even the publicity may be kept on a satisfactorily high plane. Rapid development of discoveries which are of academic interest may be secured when patent rights assure a commercial producer of protection in the field. And further, the income from the sale may be made to yield to the scientific laboratories that wherewithal for more work which is always a concern of the administrative officers. The financial support of research may become thereby an increasingly secure endowment, growing by geometrical progression.

On the other hand, an example of the danger of grave disadvantages is contained in the possibility that a patent for a "discovery" in such a shifting field as that of internal secretions may be granted when no real advance has been made, but that this patent will serve to place very unfortunate strictures on other men who subsequently do fundamentally important work in the same field. This could well delay the availability in practical medicine of some of the dramatic discoveries of recent years. Patents may be abused as well as be made to protect the interest of the public.

These obvious suggestions are made not to offer an answer to this vexing question, but to stimulate a more public debate on the merits of patenting discoveries. Might not the American Association for the Advancement of Science have a formal presentation of this matter at its next meeting? Perhaps two proponents of the patent scheme might have each a twenty-minute opportunity to present the advantages, with two others opposed to this method using a similar time for the contrary point of view. This could be done with dignity and with freedom from personal bias or emotional twist. The matter is of general importance, justifying the attention of all men in science. The printing of such a discussion would undoubtedly develop further ideas from the minds of the readers of SCIENCE. It might be worth while

to have the manuscripts for such a debate prepared far enough in advance so that all the speakers would have opportunity to read them before they were delivered. The questions at stake could thereby be brought actually to concrete discussion with less waste of time or failure to meet issues.

A further scheme for control might serve to solve many of the difficulties suggested above. Might not the control of all practical exploitation of discovery be vested in one authoritative body for the nation? Whether it be by patent or by the sanction of widespread agreement, no manufacturer would be allowed to sell a drug unless its production and sale were according to definite ethical standards. Income from such sales could be used to provide a royalty for the research funds to support investigation in whatever laboratories needed assistance. This concept would be extended to any phase of scientific work desired. The creation of a single controlling body for the country would do much to remove the danger of jealousies between institutions. The opportunity would be open for all laboratories to profit from discovery in general, as a fair return for the admitted fact that every discovery is based on the previous work of countless investigators. Control of the product of our research would be accomplished with as broad a social vision as such a central organization could furnish. The commercial interests could be adequately protected at the same time.

It may be mentioned that the American Medical Association has made a beginning of a non-legal control of drugs and foods involving part of this social protection. Perhaps the National Research Council might be made the holder of all such patents or the central body to control the application of research in commercial production. The council has already developed a wide acquaintance with the needs of American laboratories. It has provided opportunities for many students to continue investigation. Its limited funds have been dispensed by a changing group of men from the ranks of scientists themselves. The council has earned the respect of the investigators of the country. In this organization, already set up, may be the basis for an unselfish authority to advance research and its prompt application in the life of men even more effectively.

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POTASSIUM PERMANGANATE AS AN ANTIDOTE FOR SNAKE VENOM

FOR many years one of the most generally recommended antidotes for snake poison has been potassium permanganate. More recently, considerable doubt has been expressed as to the efficacy of this chemical in cases of snake-bite.

At intervals for the past two years the writer has been experimenting with white rats in the endeavor to get some experimental evidence upon the subject. An abundant supply of dried venom of rattlesnake was obtained through the courtesy of the Antivenin Institute of America. This dried venom dissolves readily in normal salt solution and may thus be injected into the animal with an ordinary hypodermic syringe. Subcutaneous injections were made, owing to the difficulty of injecting directly into a blood vessel in so small an animal; this requires a larger quantity of venom for each animal, but the effect is quite promptly evident, death in some cases occurring within an hour and generally, if it occur at all, within twenty-four hours.

The animals were etherized for ease of manipulation, and the permanganate in the form of a 1 per cent. solution in distilled water was injected immediately after the venom and at the same spot.

The rats were found to be, relative to their size, highly resistant to the Crotalus venom; and within a comparatively wide range the size of the rat had little relation to the amount of venom necessary to produce death.

Two hundred and sixty-seven rats were used, but in the endeavor to find a minimum lethal dose of the venom many were killed without gaining any direct information upon the main object of the research. More than a dozen were used to prove that injection of the permanganate solution alone is not nearly so harmful to living tissues as has been claimed. There was so much variation in the individual susceptibility of the rats to the venom that it seemed impossible to determine a minimum lethal dose, and after many trials it was found that 20 milligrams of the dried venom was about the smallest amount that could be called a "certain lethal" dose, and in some cases this failed to be lethal. About half of the rats were injected with the venom alone, and in the other half the venom was immediately followed by an injection of the permanganate.

In the chief experiment, where the rats were given 20 mg of venom, the results seemed to show a distinct value for the permanganate. Of 48 rats given the venom without the permanganate only 7 rats, or 14.6 per cent., recovered; while in the 47 rats in which the permanganate followed the venom 13 rats, or 27.7 per cent., recovered. Also the average number of hours that the rats which died survived was 21.3 in the case of the rats without the permanganate and 31.3 in rats which had received the permanganate; in