tapered outlet designed by the author and manufactured at this works. The tube has been in successful operation for six weeks of twenty-four hour working days and is still in commission. Several more are now in use and mark a considerable reduction in cost of carbon determinations as the material from which the tubes are made costs less than 1 cent per tube.

The advantage of the tapered outlet very soon suggested the making of a tapered clay inlet which is shown at K in the illustration and also at L-M.

The clay part of the inlet is a duplicate of the outlet end. The tube is charged and discharged by re-

pierced by the cylindrical surface of the combustion tube which makes only a single circle of contact between the stopper and the tube. The slip-over gives a tangential contact which provides innumerable circles of contact.

Further superiority of the tapered clay and rubber sleeve inlet is that, should the bore of the combustion tube tend to be elliptical instead of a true circle, the elasticity of the rubber sleeve will still give a pressure-tight connection on account of the large surface of contact.

Again, many combustion tubes offered by dealers are rejected because of grooves in the interior walls,

moving L-M which is connected to the main part of the combustion tube by means of the rubber sleeve M. This connection is a piece of $\frac{3}{4}$ inch bore, $\frac{3}{16}$ inch wall and $2\frac{1}{4}$ inches long, pure rubber tubing. This sleeve is more easily handled than a rubber stopper. The operator grasps L-M at the clay part L and slips it over the main part of the combustion tube and twists it firmly in place. The clay part L offers a substantial hold for one's hand and is absolutely safe. A glass taper would be dangerous as it might be crushed when grasped, causing a wound.

The slip-over connection is geometrically a tighter connection than a rubber stopper, for the reason that the latter affords an example of a conical surface

at the inlet or outlet ends, which make tight connections with rubber stoppers impossible. The tapered slip-over connection renders such tubes perfectly satisfactory.

The entire apparatus with the single exception of the little mercury valve tube attached to L-M is the author's design and shows but one rubber stopper at an unimportant point in the little KOH drying tube at the extreme outlet end of the combustion train. This could also be eliminated by a small glass taper or clay taper.

LABORATORY OF THE PARK WORKS
CRUCIBLE STEEL CO. OF AMERICA

ADDRESSES

EXPERT TESTIMONY—ITS MATERIALITY—CAUSES FOR ITS DISCREDIT—AND REMEDY¹

By JUDGE J. T. RONALD

Expert testimony does not always consist entirely of opinions. The bacteriologist *knows* whether microbes are in the water and whether germs are in the food; the toxicologist *knows* whether poison is found in the tissues; the metallurgist *knows* that certain clays contain aluminum and that it will bubble forth under certain heat; the chemist *knows* the results to follow certain conditions; the doctor *knows* the causes of many diseases and conditions; the constructive engineer *knows* the tensile

strength of various materials; the civil engineer *knows* levels, curves and volume of cuts and fills. All this is expert testimony, but this paper deals only with that class of expert testimony which consists entirely of opinions on questions of science or skill, given by persons learned or experienced therein. It constitutes the exception to the general rule of law, that opinions are not admissible in evidence.

Eminent jurists are on record in favor of the abolition of this exception, and the rejection of all opinions as evidence. This, in my opinion, would be a serious retrogression, and would result, in many cases, in excluding from courts of justice material truth, and the consequent rendition of unjust judgments based on falsehood.

The field of judicial investigation, requiring the assistance

¹ Address delivered by Judge Ronald, of the King County Superior Court, before the Puget Sound Section, A. C. S., March, 1913.

of experts, is illimitable. Questions relating to human anatomy, diseases of the human body, derangement of the functions of the brain, the genuineness of handwriting, valuation of or damage to property, compliance with technical requirements of contracts, infringement of patents, causes of death, existence of mineral veins, customs of marine traffic, causes of this or that chemical, electrical or some other natural phenomena, of which the average lawyer, juror and judge possess no knowledge, are, in some form or other, subjects of daily investigation in our courts.

The further advancement of sciences in new and unexplored regions, supplanting last year's contested theories with this year's established facts, and evolving from last year's unlocked dark mysteries the dawning light of this year's progressive theories, thereby appreciably magnifying the importance of enlightening the trial tribunal with the best evidence which advancing science can produce, makes the testimony of the expert more and more a material aid to the ascertainment of truth. Nor must it be supposed that the expert in the scientific field deals altogether with mere theories.

While it is true that many of Nature's laws are not understood; that many conflicting systems of some of her branches of science have not been reduced to uniformity or exactness—thereby affording an ever fruitful source for conflicting theories, or for disagreements among contentious exponents, however sincere, yet, in the words of an eminent writer: "No one who is borne along by the irresistible current of modern inductive thought, can escape the conviction that in the realm of Nature, all things—all activities—conform to definite and immutable laws; that many of these laws scientists now understand and have formulated in terms of mathematical precision. The astronomer has scanned the heavens and read the glories of infinity; the geologist has studied the earth and found 'tongues in trees, books in running brooks, sermons in stones and good in everything.' Old ideas have perished in the retort of the chemist. A new world has been discovered by the microscope; everywhere has been found the infinite. In every direction man has investigated and explored, and nowhere on earth or star has he found the least interference with the external reign of Nature's laws."

A practical chemist can tell whether stains are of blood or rust, and if of blood, whether of man or beast. The experienced toxicologist can determine whether death be the result of poison; yet, upon true answers to these and many similar questions, justice itself, stern and exacting, or a human life may depend.

Such testimony is often the only means of arriving at the truth, and "When delivered with caution and without bias in favor of either party or in aid of some speculation and favorite theory, it becomes a salutary means of preventing intelligent juries from following a popular prejudice, and deciding a cause on inconsistent and unsound principles."

Yet, material as expert opinions are to the administration of justice, the courts are confronted by a condition where, whatever the causes, the evidence of the paid expert has very little, if any, value with judge or jury. It is admitted because the law allows such, and because nothing better can be had, but it is a common occurrence, after such testimony has been elaborated and at great expense introduced, to see juries who, instead of being enlightened and aided, are but bewildered and perplexed, and show their contempt by absolutely disregarding the whole mass thereof. "They do not attempt to weigh honors, learning, experience or standing of one expert contradicted by another. They do not attempt to compare relative value or reasonableness of conflicting expert testimony."

While conceding its importance, it is condemned by judges in general, by respectable legal text books and journals. It meets no praise in any recent decision—finds no welcome in any existing court. One author says: "There is a growing tend-

ency to look with distrust upon every form of skilled testimony."

An eminent writer and lawyer in an address before the Pennsylvania Bar Association in 1898 said: "It is patent to any one who chooses to inform himself that expert testimony, as now received in our courts, is looked upon by the public as an unmitigated farce and a nuisance."

The Supreme Court of Michigan (29 Mich. 4) says: "The experience of courts with the testimony of experts has not been such as to impress them with the conviction that the scope of such proofs should be extended. Such testimony is not desirable in any case when the jury can get along without it."

The Supreme Court of the United States (1 Curtis 439) says of it: "This species of evidence is less satisfactory than any other."

Nowhere is this state of affairs more deplored than among members of the profession themselves. *The Medico-Legal Journal* of June, 1912, of medical opinions, says: "The value and efficiency, and public utility of medical expert testimony has fallen into great disfavor among all classes of our people in a lamentable degree."

A well-known alienist, writing in the March number of the same journal, said of his own profession: "No class of specialists in any profession has been as bitterly assailed and severely criticized as the alienists. * * * They are the victims of public suspicion, of newspaper condemnation, and of the criticism of their own colleagues in the medical profession. * * * The shadow of suspicion universal and disquieting falls athwart the reputation of the alienist and, like a freak of the unreasoning elements, descends alike upon the just and the unjust."

Now, it is a bad condition of affairs when testimony so material, and in many cases absolutely indispensable, to the cause of truth and justice, should go upon its mission so tainted and discredited. There are underlying causes for this degradation, and before this class of evidence can have its due weight and effect it must regain public confidence; to do this the underlying causes must be removed.

Among lawyers generally, and judges and thoughtful writers on the subject, there exists great unanimity as to the principal causes responsible.

One contributing cause is often found in the lack of qualification of the expert himself, or in the ignorance of counsel, and sometimes in both. Courts are often too lax in applying the tests of qualification. Instead of requiring the proffered expert, as a pre-requisite to giving his opinion, to show he possesses special knowledge and skill concerning the particular subject under investigation, all that is generally required of him is to say he possesses some knowledge of the subject, whereupon the Court indulges the presumption that he is entitled to exploit his theories. My mind recalls an instance related by a prominent lawyer, where the "whole construction of a railroad was shown to be wrong from beginning to end by the testimony of a man who had been a section foreman until he had reached a point of inefficiency even for that job."

I have known expert surgeons to be totally discredited by glib and voluble doctors whom no intelligent man would trust to sew up a cut finger.

Average professional knowledge does not supply proper qualifications in all cases; yet average doctors often testify without any investigation or experimentation, in cases involving chemical or microscopical examination. I have, on more than one occasion, witnessed the spectacle of an ordinary doctor who never saw the defendant until the day of trial, and then only for a few minutes when the prisoner knew he was being watched, setting up his opinion with an air of greatest confidence, against the experienced alienist who had been observing by night and by day without knowledge or suspicion on the part of the prisoner.

Again, it is not uncommon to see the old successful practi-

tioner, with presumptuous pride, relying entirely upon his learning—his reputation—without making the least investigation of the precise matter in dispute, in face of the well recognized fact that "experiment and discovery are so constantly changing theories on scientific subjects that the books of last year may contain something which this year everybody rejects as absurd," and when such an experiment is made by another, discovers the error of his position.

And often when the expert is well qualified, the lack of knowledge of examining counsel deprives court and jury of the expert's science.

The more counsel knows of the science under investigation the more easily can the whole truth be extracted from the scientist. It is not always easy, under our rules, for an expert, however skilled and unbiased, to state the whole truth clearly in answer to questions propounded by uninformed lawyers, and if the expert, perceiving the lawyer's lack of information, and noting the defects in his questions, suggests the needed elements to elicit the whole truth, he is called down by the other side for volunteering, and required to confine his answers to the senseless questions propounded.

Ofttimes an illustration designed to bring out the whole truth plainly, is spoiled by confusing interruptions of the examining counsel, or technical objections of his opponent. Often on cross-examination a paragraph from some book is read to the expert witness conflicting with the opinion he has advanced.

Now it is a well-known fact that writers on science, and especially medical science, have their various and conflicting theories which are sustained or combatted with great ingenuity. The other lawyer, and perhaps the expert himself, does not know that the theory supported by the quotation read may have been "vigorously contested or perhaps triumphantly overthrown by other authors."

Another contributing cause is the "Hypothetical Question." This judicial "Hydra" has been long tried, fairly weighed and, to the detestation of all fair-minded experts and the abhorrence of all broad-minded courts, has been found to be a useless vampire which, in practice, devours the very truth it was, in theory, designed to convey. Whatever the theory of the rule requiring it, in practice a vast majority of hypothetical questions do not, and from the nature of the case ordinarily cannot adequately and, therefore, impartially present either the actual or most probable state of the case. Sceldom is, and, assuming the fairest intention in the examining lawyer, rarely can the question be so framed as to embody a full and fair submission, or to embrace a completely comprehensive view of all the relevant facts or elements in the case. Therefore, the opinion of the expert, who has not himself heard all that was to be heard, nor seen all that was to be seen, must necessarily cover only a part of the ground and be misleading. The fact that other and new elements are injected, or brought out on cross examination, eliciting apparent modifications or qualifications of the opinion in chief, tends to develop a seeming inconsistency and to create in the mind of a juror an impression that the expert is a partisan, who in his original answer attempted to mislead the jury and who, finally contradicting himself, is unworthy of belief. This method has been aptly characterized by one writer as the "Hypotheses abomination—a lamentable method, vicious, misleading and subversive of every attempt at fairness." Concerning it and its answer, another has written: "It is perhaps the most abominable form of evidence that was ever allowed to choke the mind of a juror, or throttle his intelligence."

Another contributing cause lies in the fact that there is no limit, except the arbitrary discretion of a court, as to the number of expert witnesses a party may call, and it is rare when one party will content himself with a less number than his opponent had. This practice, besides producing a "motley collection

of conflicting opinions" leaving confusion worse confounded, tends to disgusting prolixity and entails an expense far beyond the value of any results realized.

Concerning this practice a Justice of the Supreme Court of the United States (29 How. 101) said: "Experience has shown that opposite opinions of persons professing to be experts may be obtained to any amount; and it often occurs that not only many days, but even weeks, are consumed in examinations to test the skill or knowledge of such witnesses and the correctness of their opinions, wasting the time and wearying the patience of both court and jury, and perplexing instead of elucidating the question involved in the issue."

Another member of that high court in 1 Curtis 439 said: "It is common remark that when there is any room for a difference of opinion, experts in about equal numbers will generally be found testifying on each side."

Justice Miller, one of the ablest members who ever graced that august bench, said (4 Dill 488): "My own experience, both in the local courts and in the Supreme Court of the United States, is that whenever the matter in contest involves an immense sum in value, and when the question turns mainly upon opinion of experts, there is no difficulty in introducing any amount of them on either side."

But chief above all causes, and far more disastrous in its results, is the partisanship of the experts themselves. I do not wish to be understood as intimating that experts, as a rule, are dishonest. Far from it. No class of experts have suffered so much in reputation among jurors and the public generally as medical experts, and yet to say they all, or even generally, are dishonest is to utter an infamous libel against the most unselfish profession in the world. But there are dishonest men in all professions. I am impressed with the conviction that some make a business of furnishing expert opinions to order. Sometimes in their partisan zeal to further the interest, right or wrong, of the party employing them, they will not hesitate to inject into a case, not only an immaterial, but a dishonest element. Time and again have I heard a physician, driven to the wall for an excuse for his opinion that a litigant's injuries were not the result of accident, defend his untenable position by delivering a supposed "knock out" to the effect that he had found upon the person of the party, scars which might have been (not that they probably were) caused by syphilis—thus injecting into the case a false theory or possible defense never testified to by a single witness or suggested by any inference from the pleadings.

In a certain personal injury case in this county some years ago, plaintiff's expert testified to permanent injuries; defendant's experts testified to the contrary. At one period during the trial the medical gentlemen finding themselves together in my present chamber, fell to discussing the merits of the respective theories. One of them, at the time of the highest standing in his profession, was overheard to say: "I am an expert for the plaintiff and must necessarily hold up the plaintiff's cause of action. You are an expert for the defendant, and you must necessarily testify in favor of the defendant."

The public have not forgotten an episode occurring during an inquiry about two years ago into the sanity of Harry Thaw, where a certain prominent alienist swore that Thaw had no incurable mental disease; whereupon being confronted with a report he had made before the famous trial to Thaw's counsel, to the effect that Thaw was burdened with a "hereditary malady with a sequence of aberrations that amounted to a chronic ailment," he attempted to explain his contradictory statements with the statement that these anti-trial opinions were merely a "medical brief" for the use of Thaw's counsel during the trial.

It is just such exhibitions as the foregoing by exponents of science that provoked from a learned writer the following severe arraignment of science: "If Science, for a consideration, can

be induced to prove anything which a litigant needs in order to sustain his side of the issue, then Science is fairly open to the charge of venality and perjury, rendered the more base by the disguise of natural truth in which she robes herself;" and that caused Professor Himes, a writer in the *Harvard Law Journal*, to say: "It is often surprising to see with what facility and to what extent their views can be made to correspond with the wishes or interests of the parties who call them."

This language can apply only to dishonest experts, for it is not correct to say, in all instances, that experts shape their views to correspond with the wishes of the employer. The honest expert refuses to conform his views to any interest save what he believes to be the truth. As a lawyer cannot be expected to employ an expert whose opinion is against the interest of his client, so a scientist, who finds his views happen to conform with the view of the employer, violates no rule in engaging, for a consideration, to testify his sincere opinion. But when an expert, sincerely believing in the correctness of his views, finds himself employed to defend them because they accord with the theory which his employer seeks to establish, there naturally springs in the most honest breast a zeal to prove, in this battle between contending theories, the soundness of his own opinion. And the stronger his convictions, the more natural it is—however honest and unpurchasable he may be—that he should become the earnest advocate of his theory, and, unavoidably, a zealous and loyal assistant of the attorney paying him to establish that theory. It is too much to expect an expert, who thus looks upon the contest as a battle between the true and the false, in which he is engaged to aid in the triumph of the true, to be entirely unprejudiced. He will not sit calmly and see his theory, which he believes to be the truth (and which he is paid to establish), overthrown by what he believes to be the false. The greater his sincerity, the more earnest his advocacy. The experts then become the contending parties in a contest of theories. They align themselves into classes—each becoming a champion of his own class theory, and assuming the attitude of the advocate rather than that of a scientist. The expert is then truly biased. It is a purely scientific bias due to his peculiar views. It may be likened to the religious bias of the sincere and zealous minister favoring the theory of hell fire for the sinner. "Against such a bias no amount of self-restraint, nor the most sensitive conscience will fortify a man." Such a man is often an upright, learned, conscientious man, deserving and commanding the greatest respect and profoundest admiration—all of which only tend the more to confuse the jury and bewilder and perplex the court. Time will not permit citation of numerous instances of record verifying this statement.

The field of the engineer, comprising as it does questions of drainage, dyking, dams, adjustments, etc., affords a most prolific source of some most fallacious theorizing, and of some rank partisanship. As samples of the former I recall an instance where the question before the court was the feasibility of the present system or plan now happily in operation for the drainage of our White River Valley in this county. The establishment depended, by statute, upon the findings of the court of its feasibility. The farmers were hopelessly divided. Some were actively urging the system as the only means of reclaiming and utilizing that part of the valley subject to overflow; others were bitterly opposing it as a menace carrying certain destruction to the whole valley—the reclaimed as well as the unreclaimed. Engineers were aligned in support of the opposing theories. One class contended that the overflow of the valley, which occurs for a short period yearly following our chinook winds, would result in diverting and shifting the united waters of the White and Green Rivers to the channel of the proposed canal, scouring out and irreparably damaging the whole of that fine valley. The court, however, adjudged the plan to be feasi-

ble. Several miles of canal, reaching almost the entire length of the valley, were dredged. Instead of the channel below the junction of the two rivers shifting to the canal, the White River above their junction changed its course entirely from the north to the south, and now finds its outlet through the Stuck and Puyallup Rivers to the Sound forty miles to the south, while only the waters of the Green River now flow north through the original channel, of what, before the shifting, was called White River; and for years abundant crops have been produced where for ages before there existed only marshes and duck ponds.

Again I recall where a jury in my division of the Superior Court was assessing damages for the present regrade of Fifth Avenue in this city. As all know, this avenue runs along the face of the hill. The owners of property on the east or uphill side of the street were basing claims for damages on the liability of the whole hill sliding down as a result of the new and deeper cutting. Again engineers were aligned—some on behalf of the city and others on behalf of different property owners. Both sides were familiar with the character of the soil and its different substrata, and each expert became an earnest advocate of his class theory. The jury put greater credence in the opinions of the city's engineers and awarded damages on the theory that there would be no sliding. Less than three years have elapsed. The whole face of the hill has been sliding. Costly buildings have long since toppled, a mass of ruins, while a large area of the hillside is continuously shifting, requiring the constant work of teams to keep the regressed streets free from the moving earth, to the enormous damage to the city.

But a field wherein the engineer witness becomes the partisan advocate is in cases for the assessment of damages for adjustment of property to regrades, etc. All are familiar with the rule allowing damages for buildings wholly taken or partially damaged by regrades. Where there is no means for adjusting such buildings to the regrade, they, of course, are totally lost, and then the amount is easily ascertained; but where the conditions are such that the buildings or plants affected may be adjusted, the statute allows the estimated cost of making a reasonable and proper adjustment with reference to the new grade. Here is where I have seen the engineer become a real artist. There are many different ways of adjustment; but what the law requires is the most feasible and practical adjustment, all things considered, with reference to the new grade, and for the allowance of the reasonable cost thereof. It has been, and is, the practice of some owners to employ engineers to devise plans of adjustment. Many times I have noticed that the plans were presented and advocated by the engineer witnesses with the greatest earnestness and plausibility, not with a view to procuring recoupment for actual loss, but with a view to putting the property owner in a better position than he was before. Instead of being made whole for his actual loss, he was to profit off the city.

The Supreme Court of Ohio, concerning this partisan tendency of experts, says (12 Ohio 483): "Whenever they have enlisted on the side of either party or of some favorite theory, the difficulties are greatly multiplied, and however honest or renowned for professional character the witness may be, such will be the conflict of their testimony in nine cases out of ten, that it will be utterly unsafe for a jury or court to follow or adopt the conclusions of either side."

And the Supreme Court of California (40 Cal. 396) declare: "It must be painfully evident to every practitioner that these witnesses are generally but adroit advocates of the theory upon which the party calling them relies, rather than impartial experts upon whose superior judgment and learning the jury can safely rely. Even men of the highest character and integrity are apt to be prejudiced in favor of the party by whom they are employed. And as a matter of course, no expert is called until the party calling him is assured that his opinion will be favorable.

Such evidence should be received with great caution by the jury, and never allowed except upon subjects which require unusual scientific attainments or peculiar skill."

An expert is defined in 27 A. L. Reg. 3, to be: "A man who is paid a retainer to make a sworn argument."

Elliot, in his "Work of the Advocate," says of this definition: "Bitter as this definition is, it is not entirely inaccurate. Expert witnesses usually do, with swiftness and avidity, seize every opportunity offered them to put forth an argument in the form of an opinion, and such an argument is the more hurtful because of the guise it wears. As an argument and nothing more it would do little mischief, but as an apparent opinion it may do much."

"Some experts do not realize their tendency to partisanship. Others are badgered into it by unfair efforts of cross-examiners to throw doubt and obscurity upon their direct testimony. These efforts are often instigated and directed by the expert advocate for the other side."

A prominent attorney writing in the *Yale Law Journal* a couple of years past, said: "To the jury an expert is an expert—a kind of intellectual prostitute ready to sell his opinion and enlist in the service of the side that pays him."

From "Best on Evidence" I quote: "There can be no doubt that testimony is daily received in our courts as scientific evidence to which it is almost profanation to apply the term."

The Maine Supreme Court (65 Me. 74) characterizes it as the "Vain babblings and oppositions of science falsely so-called when the hopes of a party depend rather on mystification than enlightenment."

The evil is of long standing, and of increasing gravity. The subject of a remedy is being discussed by various State Bar Associations, and by numerous writers in legal and scientific journals, but there is no unanimity as to any remedy. Six of the states have enacted laws on the subject, but there is no uniformity, and but little effectiveness in the laws thus far adopted. Of the proposed remedies up to date, the two apparently most favored provide: One for the appointment of expert jurors as triers of scientific issues, while the other proposes the appointment by the court of all expert witnesses; that their compensation shall be paid from the public treasury. Various details are prescribed, such as providing for the reimbursing of the public treasury by the litigants, and for preventing the experts from knowing at whose instance, or expense, they are appointed.

The first method is not new. It has been tried. It originated in the old Roman practice (Dig. Lib. XXV. Tit. 4) and was one of the modes selected by our English ancestry away back in early times, before trial by jury was much developed, for the trial of issues relating to certain classes of facts, and so strictly was the mode adhered to that we find, even in that misty age, one instance at least of a jury exclusively of *matrons de ventre inspiciendo*. This mode of trying scientific causes by expert juries continued with much regularity, as a part of the English practice, during the thirteenth, fourteenth and fifteenth centuries, and even, but with waning regularity, up to the eighteenth century.

Riley's Memorials contain numerous instances of specially qualified juries called to try such issues as: Fishing nets with meshes smaller than those required by the trade; improper tanning of hides; false tapestry; improper hats and caps; false pewter vessels; false gloves; false wine; putrid victuals; malpractice by surgeons; etc., etc.

However well this mode may have worked as a system applicable to a large and densely settled population, with many branches of science either unknown or but little understood, it is sure that under the theory of jurisprudence prevailing in our American colonies and later adopted as a part of the government of our states, recognizing the common law jury

as an integral part of our system, with our sparse population and limited number of scientific exponents of any particular branch of science, this method of calling experts as jurors was found inapplicable and gave way to our present method of allowing the respective parties to call experts as witnesses before our common law jury. And whether, in this age of advanced science, and with its numerous scientific experts and our increased population, it would be practical at this time to provide for a jury of purely scientific experts on every particular branch of science is, in my opinion, very problematic, but it is certainly very questionable whether such a law would not be violently opposed as contravening the whole theory of our jurisprudence.

And it is seriously questioned whether the other proposed remedy of placing the appointment of experts exclusively in the power of the courts would not be depriving a litigant of his constitutional right to call witnesses and produce evidence material to his case. It is, however, certain that any legislation on the subject must meet the approval generally of the bar; and it is equally certain that the bar will never approve any legislation which will enable the courts to create a privileged class of experts. A practice has latterly grown up for the court, at the instance of one litigant, to appoint one or two disinterested medical experts to examine the opposing litigant. This practice has now given rise to the charge, very extensively entertained among the bar, that the experts appointed by the court are not impartial, but are endowed with a leaning one way or the other; and when it is considered that judges are not infallible, that every judge generally has his family, or some other physician in whom he has greater confidence than in some others, and which doctor, notwithstanding, may be a charlatan in the profession, or under regular salary from some interest, there is some ground for this complaint.

An attempt has been made in some states to meet this by legislation requiring the judge to make appointments from lists selected by the parties, but in practice there has been found no way to compel the parties to agree on selections. The truth is, no legislation will afford a complete remedy. Something in addition to legislation is required. The right kind of laws can, however, do some good. If I were recommending any legislation I would propose a more liberal rule or policy for the admission of expert opinions. I see no objection to the judge appointing the experts from lists selected by the parties when they agree, but in case of failure to agree, I would not deprive a litigant of the right to call, at his own expense, his expert witnesses, but I would limit the number he should call. The party thus limited will be disposed to call only the ablest experts. This makes for economy in time and reliability in quality. In all cases where a litigant expects to rely upon expert testimony he should be required to file in the case notice of such intention, stating the subject, or scientific inquiry on which he proposes to offer expert evidence. Thereupon the court should have the authority, at its discretion, to appoint two experts, skilled in the same branch of science, to be paid out of the public treasury and to sit in the court room during the trial and hear all the evidence bearing upon the subject of expert inquiry, and to be called by the court, or by either party, after examination of the parties' experts, to give their opinions and to be subjected to cross-examination by both parties. Provision can be made for recoupment.

I would not restrict counsel to the hypothetical question, but would allow the expert witnesses for both sides, and the court's experts, sufficient latitude, by way of illustration, explanation or otherwise, to enable the jury to understand and comprehend exactly, if possible, the experts' positions. When the judge or juror knows the reasons for an expert's opinions he will be better able to weigh that opinion, and the court's experts will be better able to approve or disprove the same.

Such in brief are some of the benefits we might derive from

legislation, but I venture the suggestion that no legislation will make an unlearned witness competent, or a dishonest one honest, or a biased one impartial. Something besides legislation is necessary to prevent our present practice putting its premium on perjury, or reducing the honest expert to the level of the charlatan.

The real remedy, the true reform, in the final test, rests with and must come from the persons largely responsible—the professions themselves, comprising the expert witness and the lawyers. So long as it is profitable to use or to give faked or biased expert testimony, so long as it can be bought and sold without loss of professional standing, so long will it be a commodity hawked in the trial courts.

"In nearly every city of importance," writes a thoughtful observer, "there is a doctor notorious among lawyers as 'plaintiff's expert' who can be relied upon to give plaintiff what he wants. The lawyers who use him on a contingent fee retain their standing at the bar," and I might add, on the other hand, there are in such a city one or more doctors under stated salary for employers of labor, and who are known among lawyers and jurors as "defendant's experts."

The result is that doctors have largely become known or classed as "plaintiff's experts" and "defendant's experts." One class magnifies symptoms and injuries, the other minimizes and makes them imaginary. To quote from one of the aptest writers on the subject: "The plaintiff's expert has argued and reasoned himself into a frame of mind that sees in the given case just what the plaintiff's attorney needs. On the other hand, the defendant's expert sees a maligner in every man who asks damages. It is the old story of bringing to the market what the market demands. If deformities are the fashion, deformities are cultivated. We are not talking of charlatans. The doctors who are doing this are the leaders in their profession, who qualify with respectable medical degrees, professorships in leading medical colleges, and membership in the principal medical societies. Now, as long as these men can do this and remain leaders in their profession, just so long is any chance at real reform postponed. Just as long as a leading physician can accept a general retainer from a street railway company and appear day after day, in case after case as 'defendant's expert' and retain his professional respectability, just so long will you have 'plaintiff's experts' and 'defendant's experts.'"

It is not against a physician that he is under a salary from a railroad company, but this relationship makes it unprofessional for him to act, at the same time, as expert witness. His place is beside the counsel and as a medical advocate, not witness. The doctors can so frown upon the practice of acting as medical counsel and witness as to stamp it out.

When the professions "set a moral standard that demands that a member testifying under oath in court must state his opinion fairly and fully without bias and without regard to the side that calls him, neither suppressing nor overemphasizing any aspect of the case, then and only then will you have real expert testimony."

"When you have that standard established the charlatans and fake experts will be driven from the courts, because what they have to offer can not be successfully used."

Having exposed the shortcomings of other professions, I now turn to my own, and charge the legal profession with its share of responsibility. The lawyers have done as much as the experts to create a demand for "plaintiff's experts" and "defendant's experts." If the lawyer would refuse to buy, the expert could not sell. Lawyers whom no motive would induce to suborn an ordinary witness will offer a premium for the biased expert. Attorneys who would scorn to pass counterfeit bills will not scruple to palm off fake expert testimony on a jury.

There will always be lawyers who will look upon "lawsuits as games to be played and won by any means that the rules

allow" and this seems to one of the rules of the game. If the honest expert will not give him what he demands he vigorously searches in the open market for what he wants.

"If he cannot get the real article he furnishes up the counterfeit and passes it off on the jury. If he finds that the genuine expert opinion is against him, he may, at least, deliberately play the game with the counterfeit to disgust the jury with all expert testimony and even up things by leading the jury to disregard it for both sides."

"As long as the standards of the profession countenance this abuse, so long will it continue. Whenever the good lawyers will not, the shysters cannot continue to misuse expert testimony."

I cannot resist the temptation, at this point, to relate the instance of a certain lawyer in a case in one of the eastern states, who after having introduced expert evidence and finding himself confronted with outweighing contradictory expert opinions, and realizing overwhelming defeat if reliance were to be placed upon such evidence, in addressing the jury said: "Gentlemen of the jury: There are three kinds of liars—the common liar, the d—d liar, and the scientific expert."

The legal profession can reform itself. The ambulance-chasing lawyer is becoming extinct before the frowns of the profession. The present code of legal ethics came in response to the general demand of the profession. The good sense of all the professions must adopt standards in the use of expert witnesses which will make such witnesses useful and their evidence effective in the interest of truth. If the professions will establish the standards, the court will enforce them.

A scientist in the classroom aims to teach truth, and when in the court room, where a life may depend upon his words, he should be equally as impartial. He should advance nothing before a jury he would not advance before a learned society or before a class.

An expert witness should be in practice what he is in theory—an adviser of court and jury. The judgment of a scientist based upon partial facts is as unjust as a judgment of a court similarly based. No lawyer expects a biased judgment from a court. He has no more right to expect one from an expert. The expert who is the sole repository of this scientific knowledge, the sole possessor of this peculiar skill, owes it to his position as a true scientist to declare the truth as he sees it; just as the judge possessing the knowledge of the law, owes it to his position to declare the law as he sees it. A scientific man is not a concealer of truth, but a searcher after concealed truth, and, unlike the habitues whose existence depends upon concealment, he should come into court with clean hands and a pure heart, with sincerity of purpose, with a tendency and desire to ascertain and recognize truth wherever and whenever it may be found—whether in the silent meditations of his library, or after the soul-burning and anxious experimentation of his laboratory, or whether brought out by the disputes, disagreements and discussions in the court room; to conceal nothing, ever mindful of his oath which requires him to speak, not a partial, but the whole truth; or, in the language of Dr. Walton: "His testimony should be the colorless light of science brought to bear upon the case * * * To the true expert, in that responsible position, the utterance of half truths should be simply impossible."

THE SMOKE NUISANCE; A QUESTION OF CONSERVATION¹

By RAYMOND C. BENNER AND J. J. O'CONNOR, JR.

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INTRODUCTION

Neither for those who live in nor for those who even visit an industrial centre which burns a large quantity of bituminous coal, is a definition of the smoke nuisance necessary. Its effects

¹ An address delivered at a recent meeting of the Canadian Conservation Commission.