THE NEED AND THE TESTING OF PURE DRUGS.

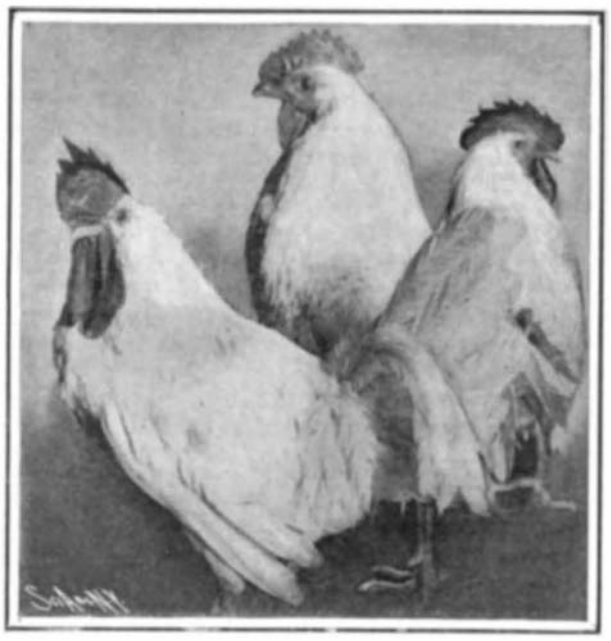
BY HUGO ERICHSEN.

It is, perhaps, not commonly realized that the druggist, by reason of necessity, occupies a position of trust toward the entire community. The helpless, the sick, the physically weak, yea, even the dying, rely upon him absolutely for safety, accuracy, and skill in the preparation of the physician's order. It would be idle to deny that cases have been known in which pharmacists betrayed their trust, but such, happily, were few in number and pertained mostly to the atrocious crime of drug-substitution. This offense is as contemptible, deliberate, and cowardly as a stab in the dark, for in most cases it constitutes a criminal act difficult to prove and against which the victim has no redress whatsoever. Even the atmosphere of the sickroom has been contaminated with the spirit of commercialism and individual greed that seems to have so thoroughly infected our so-called modern civilization. While the integrity of the average pharmacist is all that could be desired, yet he is liable to dispense prescriptions that are not what they purport to be, in consequence of the use of drugs that are either partly or wholly inert. Most druggists have neither the time nor the facilities for making a careful investigation of the physiological action of the many drugs that compose their stock. But that work of late is being done for them, on a large scale, and will eventually revolutionize the drug trade.

Years ago, many manufacturers merely complied with the directions of the United States Pharmacopœia, providing for the selection of the drug by more or less superficial means and its exhaustion by a given menstruum (solvent) to the production of a stated yield. But a leading firm of manufacturing chemists went a step further and attempted to gain some insight into the value of the more powerful drugs by estimating their content of active constituents. This work was attended with much expense and also great difficulty because of the lack of satisfactory methods of procedure. Nevertheless they persevered, and as a result were soon able to arrive at comparative results, which showed to their astonishment that different lots of such drugs as quinine, belladonna, hyoscyamus, nux vomica, and others varied widely in the proportion of the active constituents they contained; that in fact it was the exception rather than the rule to find successive lots of any given drug to be possessed of uniform activity.

The extent to which a drug is contaminated depends, of course, largely upon its commercial value and the ease with which it may be simulated. Drugs like opium and crocus, for instance, are frequently adulterated and fraud is also widely practised in connection with the "manufacture" of powdered chemicals, resinoid or inspissated substances. Although time has wrought an improvement in that respect since cascara sagrada was first introduced to the medical world, that drug is still the object of shameless substitution. Questionable preparations of it are at fault, either because the bark employed in making them is not genuine or has not been properly cured and extracted. Bark less than two years old contains an active ferment that gives rise to unpleasant after-effects and must therefore be considered impure. Other plants are often mixed with strophanthus; there are about thirty varieties of this plant, of which only six contain strophantin, the active principle.

The senna of commerce is frequently adulterated and unsophisticated buyers are sometimes supplied with Tinnevelly senna in place of it, although the latter contains only two-thirds as much of the active principle, i.e., the principle upon which the therapeutic effect of the drug depends. The sennas of Tripoli and Mecca are also of an inferior character. Much of the Chinese rhubarb that is marketed is unfit for use because it is decayed or worm-eaten. Sometimes the cheaper European sorts are powdered, colored yellow with turmeric, and passed off as the genuine article from the flowery kingdom. Asafœtida is contaminated with gum resin of an inferior quality or mixed with foreign substances, such as red clay, barley flour, etc.; in some instances the impurities have been known to reach 30 per cent. Belladonna and white bryonia are sophisticated with the root of a plant designated botanically as *Medicago sativa* and genuine calumba root with what is known as false calumba. Artificial substances are often employed to adulterate Japan camphor.



Effect of the Ergot Test on Cocks' Combs.

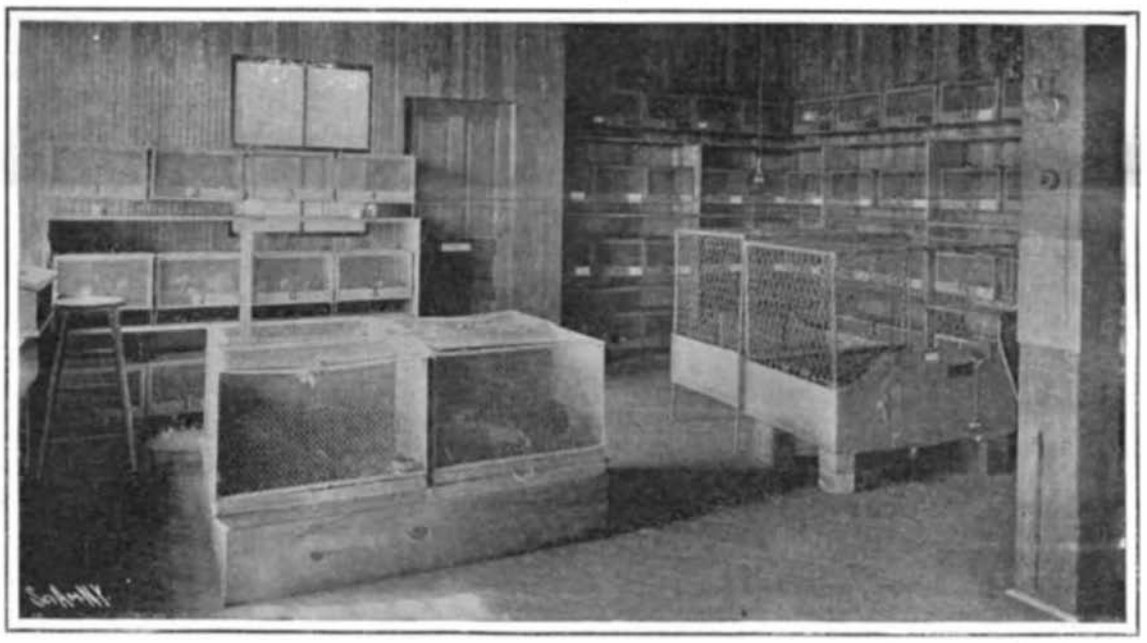
The quality of coca and that of the cinchona bark of commerce varies greatly, which accounts for the fact that the therapeutic effect of some of these drugs is so slight that they may almost be regarded as worthless. Dill and anise are used as the adulterants of conium. False jalaps are not uncommon in the market and sophisticated manna has been described by several authorities. The scammony of Smyrna is frequently displaced by a substitute manufactured in the south of France and the large or false senega of the trade palmed off for the much higher priced true senega. Much of the musk upon the market must be regarded with suspicion, as the high price of the odoriferous article invites imitation. The leaves of *Uva ursi* are often intermixed with the inert leaves of other umbelliferous plants.

The foregoing constitutes a powerful argument why physicians and druggists should avoid questionable medicinal products and give preference to medicaments that are entirely reliable, even though they may be a trifle higher in price. Only the larger laboratories in the country possess the necessary facilities and capital to manufacture a full line of first-class pharmaceuticals. They are imbued with a sense of responsibility and are aware of the fact that their reputation depends upon the nature of the goods they market. Abundant means enable them to engage experts who exercise great care in the selection of crude drugs and reject all materials that do not come up to the standard. Moreover, the gathering of the drug plants is under the direct supervision of men who are thoroughly posted in regard to the pharmacological features of the plant they are looking for. Before the remedy is placed upon the market, it is standardized, that is to say, subjected to tests that determine its therapeutic value and insure uniformity. Having decided upon a standard, the drug is extracted by the proper menstruum, in the most approved manner, assayed chemically, and "standardized" by concentration or dilution as required.

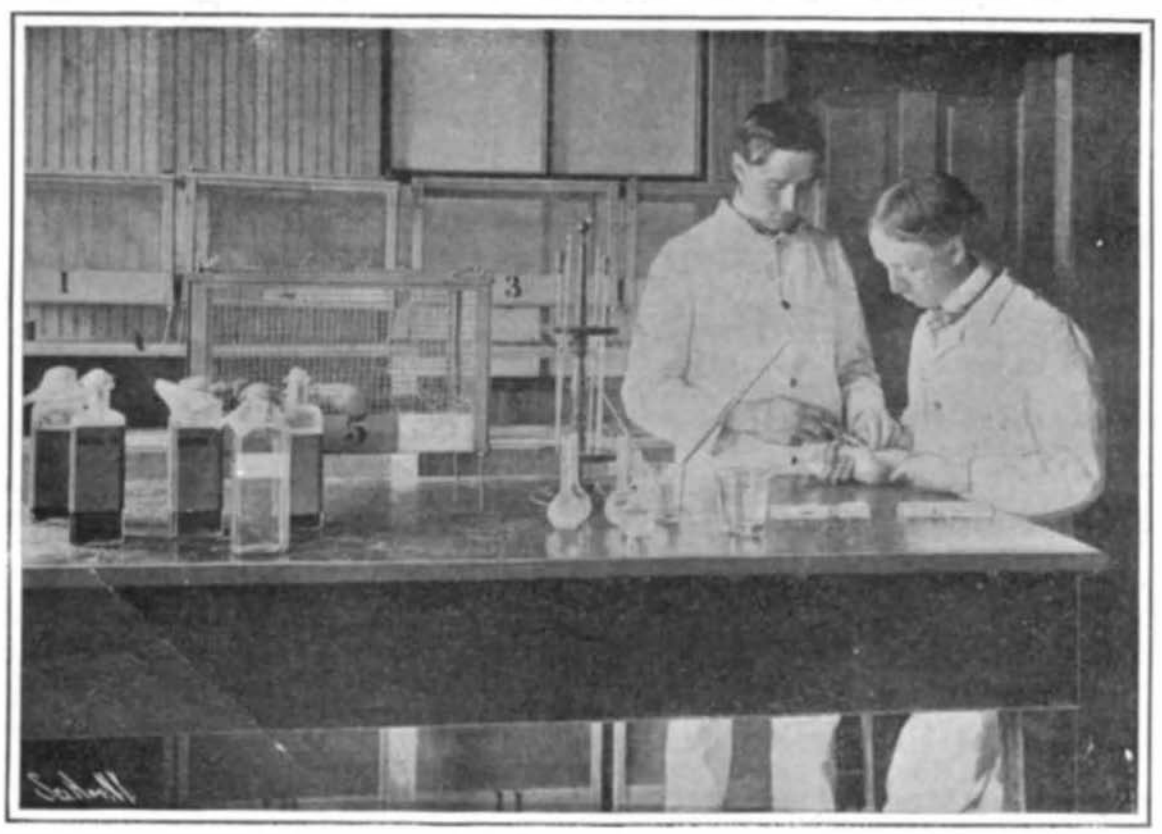
But there are certain powerful drugs, such as the heart tonics, digitalis, strophanthus, and convallaria; the powerful arterial sedative aconite, ergot, cannabis indica, squill, and others equally important that cannot be assayed by chemical processes.

Happily, the method of physiological assay is now available, and practical use is made of the fact that certain of these drugs will produce characteristic physiological effects upon certain animals. For instance, good ergot blackens the comb of the cock, while an inferior specimen fails of effect. The therapeutic value of the heart tonics is measured by means of delicate apparatus which accurately determines the effect of graduated doses upon the cardiac mechanism of frogs. These amphibians are also employed to determine the maximum and minimum dosage of standard preparations of strophanthus.

The medical man is groping in the dark when he prescribes a preparation of unknown strength, the first dose of which may prove ineffective, or possibly poisonous. Under such circumstances he is virtually compelled to make a physiological test upon his patient. Gradually the dose must be increased or diminished until he finds that a definite amount produces the effect desired. But should the prescription be refilled with a



Room in the Laboratory in Which Animals Are Kept While Being Used for Experiment.

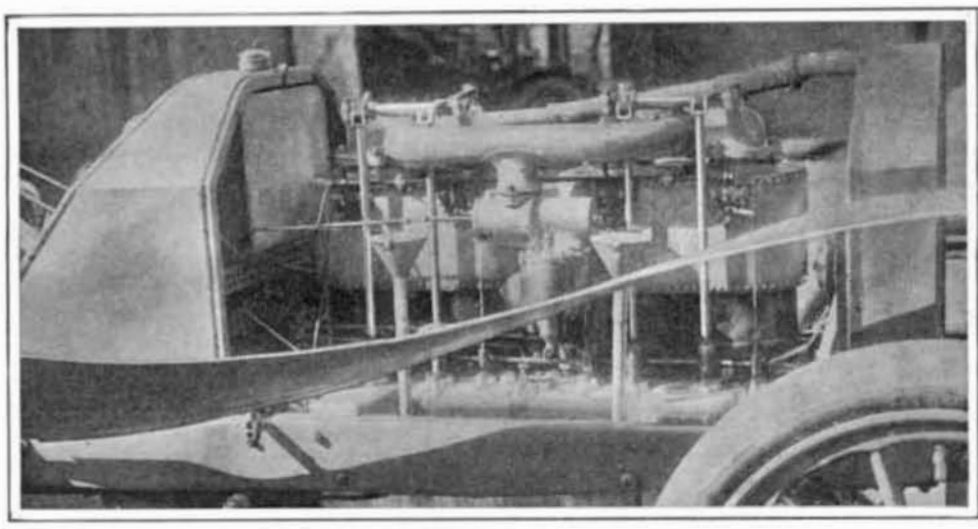


Testing a Remedy on a Guinea-Pig.

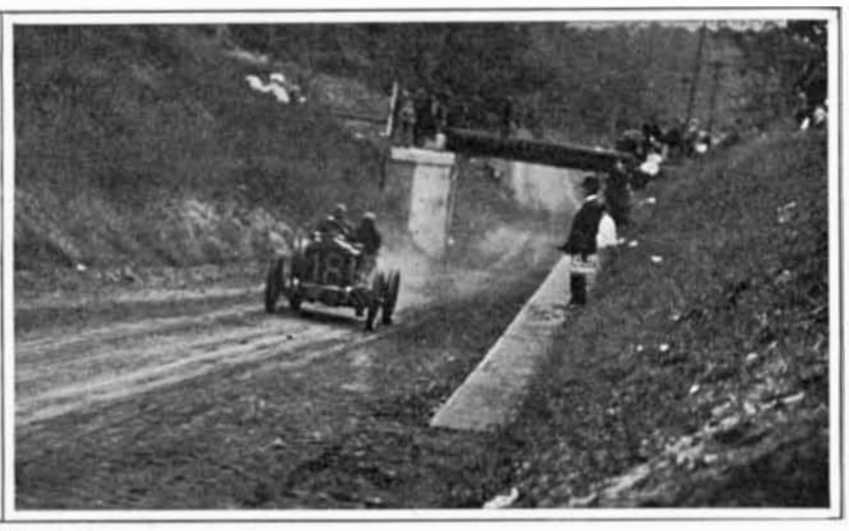
preparation from another manufacturer, or by another apothecary, the correct dose must again be determined experimentally as before. When drugs are standardized by chemical assay or physiological test, however, the physician escapes the humiliation of palpable impotence in the face of danger and there is no occasion for needless experiment at the bedside, where so frequently prompt drug action saves lives.

A RETROSPECT OF THE VANDERBILT CUP RACE.

That the third contest for the Vanderbilt cup was the most successful of the three that have so far been held, is to be credited largely to the great care and good judgment with which the Cup Commission and the officials in charge of the preparation of the course performed their several duties. Special care had been taken to safeguard both the contestants and the multitudes that swarmed out to view the race; and if the onlookers had shown a proper appreciation of the efforts made for their protection, the injuries and accidents which marked the race would have been almost entirely absent. When it is borne in mind that the crowd deliberately tore down the fences which had been put up to keep them off the track, that they swarmed entirely across the road, and refused to draw



Engine of the Locomobile, Showing the Arrangement of the Carbureter, Inlet Valves and Igniters.



The De Dietrich Racer, Which Finished Third, Ascending a Hill Near Roslyn.

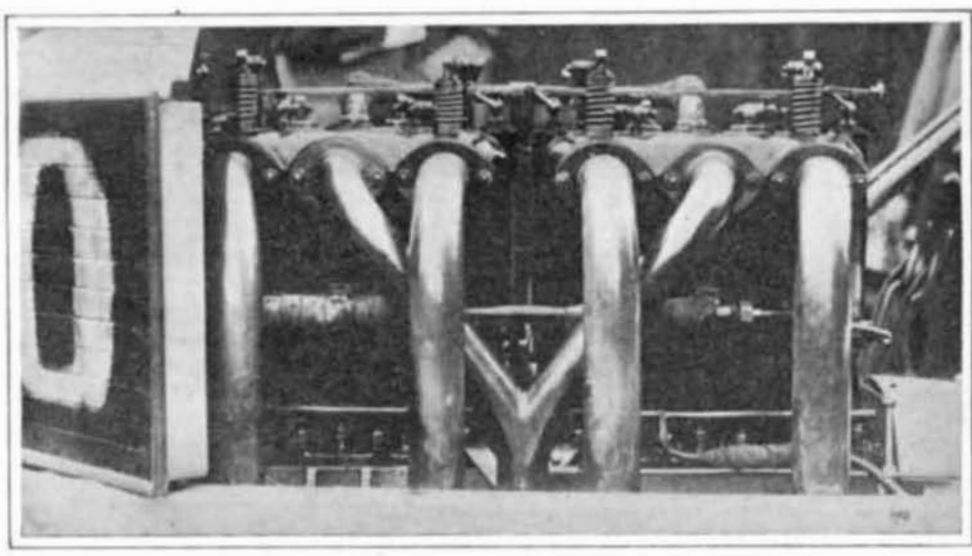
Panoramic View of the Hairpin Turn at Old Westbury, Showing Tracy Starting to Round It in His Locomobile.

Jenatzy Finishing. The Veteran Belgian Driver Obtained Fifth Place With a German Mercedes Car.

Time, 5 hours, 4 minutes, 38 seconds. Average speed, 58.51 miles per hour.

Wagner, on the Winning Darracq, Passing Through the Crowd at High Speed Just Before He Crossed the Finish Line.

Time, 4 hours, 50 minutes, 10⅖ seconds. Average speed, 61.43 miles per hour.



Valve Side of the 100-Horse-Power Darracq Engine, Showing the Branched Inlet Pipe and the Four Separate Exhaust Pipes. The V-Shaped, Finned-Tube Radiator Is Shown at the Left.

Tracy Putting on Full Power at the Last Bend in the Hairpin. This Machine Made the Fastest Round in 26:21—an Average Speed of 67.65 Miles per Hour.

SOME SCENES AND INCIDENTS IN THE THIRD VANDERBILT CUP RACE.