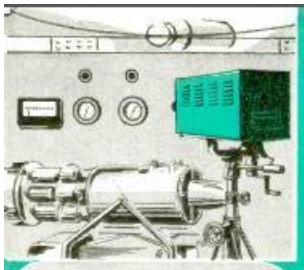
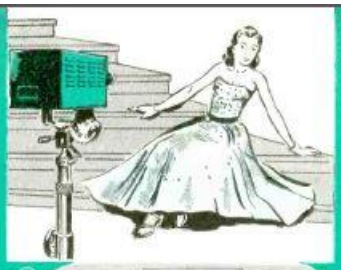




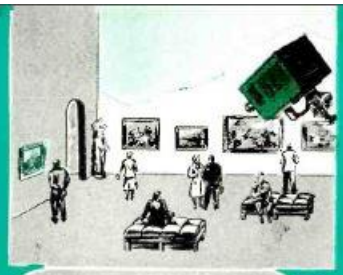
Industrial Closed-Circuit TELEVISION

COLOR increases utility of this rising new medium

WHILE the battle over color television broadcasting rages, another type of color television has been taking over without fanfare or opposition. The field being conquered peacefully is industrial closed-circuit television. Already established in monochrome, it is finding color a valuable adjunct.

The term "industrial television" has been interpreted to mean roughly all non-entertainment uses of the new medium, including its employment at fashion shows and in banks. In a number of applications, industrial television supervises operations too dangerous for human beings. It makes possible certain types of advertising displays and saves manpower in work requiring observation at a number of separate points.

Possibly the most publicized application of closed-circuit color television is televising surgical operations. Since internes can learn operating techniques only by watching skilled surgeons, making the operation visible to larger num-



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bers is important. The equipment shown on the cover was part of an installation by Du Mont at St. Clare's Hospital, New York City, where it was used during a large meeting of doctors and surgeons, who viewed a number of important operations which otherwise could have been seen by only a few.

Certain tests on machines, such as high speed motors (and now, jet units) used to be made in concrete pits, with engineers watching over a wall. In case of an explosion or a motor flying apart, the engineer's ducking speed was more important than his technical knowledge. Now these tests can be made with a camera focused right on the most important feature of the test; either on the meters as in Image 1 or on some critical part of the equipment itself.

Large department stores have already found use for television in making their displays visible to a larger number of people as well as to bring colorful displays to the attention of customers in other parts of the store or to windowshoppers, as indicated in Image 2. Gimbel's of Philadelphia and Gertz' of Jamaica, New York, have done considerable experimental work with store televisers. The scene on our cover also shows how closed-circuit industrial-type television could be used by a model to demonstrate clothes or to advertise other items.

Time is occasionally lost in a bank while a signature is being identified, and under some circumstances good will and a valuable account is lost as well. Image 3 shows how this can be prevented. The clerk can call for a copy of any signature, which can be flashed to him in a matter of seconds. The same equipment can also be used to make records available for inspection at a number of points. The records can then be kept in a central depository.

Some types of inspection, while not perilous in the sense of Image 1, bring hazards of fumes, heat, gases or splashing melted metal which make the inspector's work difficult and unpleasant, if not immediately dangerous. Image 4 shows how the pouring of metal in a mold can be viewed from much closer range than was possible under the old system of stationing a man 50 feet from the operation. Working in comfort at closer effective range, the operators can do a much better job of controlling the work.

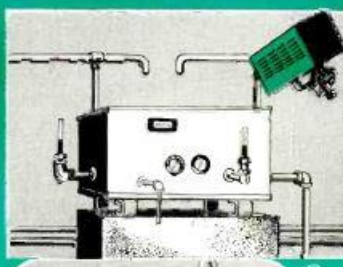
Where material is borne along a chute there is always the danger of clogging or piling up. In the case shown in Image 5, coal is moved with the help of water. One person viewing the operation on a television screen and increasing or reducing the flow of water can replace two or more men, who would otherwise be placed at various points along the chute to watch for pile-up.

The television camera can be a more efficient watchman than any human, for it can be made to operate with infra-red light. Thus it may maintain a perfect watch in a "dark" area, throwing a bright and detailed image on the screen. Image 6 is a burglary that didn't quite come off as planned.

Another type of property protection in which television can be particularly useful is that of watching objects in a museum or art gallery as in Image 7. It has a double advantage over direct supervision. The would-be thief cannot see the guard and cannot tell when he is not under direct supervision. Neither can the thieves create a diversion to draw the guard away from a given spot.

Image 8 is another instance of television used for meter reading. In certain cases direct viewing of a number of meters is more advantageous than a telemetering system, and in others optical viewing is required by law, as in the case of water-gauges on steam boilers. Industrial television equipment is the answer.

The portability of the camera is a



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factor in its versatility. It can be used for a short-time job with little expense, as in the meter-viewing project, where setting up a telemetering system would be practical only in a permanent installation. In many cases of disaster, a camera can be placed where humans are not safe, due to obstructions, gases, danger of falling material, etc. Image 9 shows how an industrial television camera might be used in a mine disaster.

Nuclear research and work with radioactive material call for remote control operations in enclosures where no person may enter once the process has started. A television viewer to watch flow of materials, gauges, reactions, and in some instances to control mechanical robots, is of course the natural solution to the problem, as shown in Image 10.

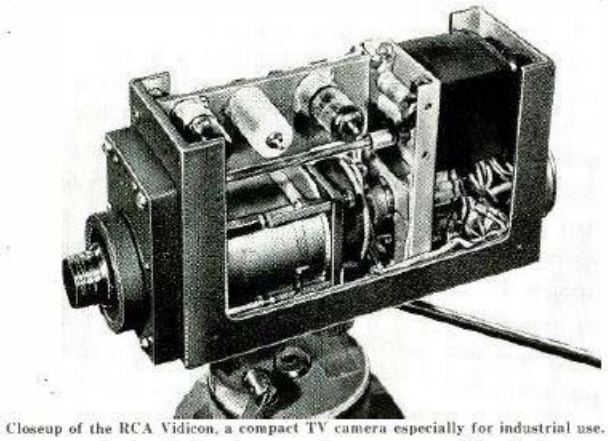
Another version of the "chute" problem is seen in Image 11. Vehicular tunnels pose a problem of traffic control which requires policemen at a number of points along the tunnel. Monoxide gas makes the job dangerous and unpleasant, and accidents pose a hazard, as in the recent case where a guard in a New York tunnel was crushed when a truck got out of control. With the help of television, one man can do the work of a number, and do it in safety and comfort.

In many of these applications, color is quite unnecessary and is not used. In others, it is essential. For example, the effect of the fashion show of Image 2 would be reduced tremendously in black-and-white. Compare the models' dresses with the one on the cover, for example.

Image 4 is another good example where color is extremely useful. In many applications dealing with great heat, temperature is often estimated by color of metals or gases.

The same is true in observing chemical reactions, as in Image 10. Often the color of a solution is the most important phenomenon to be observed.

The closed-circuit feature of industrial television has one great advantage. Since there is no broadcasting through space, there is no need of regulating bandwidth. So the industrial color television can use as wide a band as convenient. The Du Mont system illustrated on the cover uses 18 mc, the equivalent of three 6-mc channels, with a mechanical wheel for color.



Closeup of the RCA Vidicon, a compact TV camera especially for industrial use.

Hampered to some extent by its very originality and the fact that it presents previously unheard-of solutions to industrial problems, industrial television got off to a slow start, but has been making steadily increasing progress during the past year. There are now four main brands on the market: Vericon, with its new Vericolor; RCA's Vidicon; the Utiliscope handled by Diamond Power Specialty Corporation; and the Du Mont 18-mc color equipment.

Of these, the Vericon, made by Remington-Rand, and originally described in RADIO-ELECTRONICS March 1949, has recently added color, using the CBS color disc and a considerably wider band than the older monochrome equipment. Previous users of the equipment have been quick to realize the additional value of color and two large Vericon installations in college medical schools are now switching to Vericolor.

The RCA Vidicon has been used up to the present as a monochrome system, though its designers have pointed out that by using three Vidicon cameras to pick up the three primary colors, it can be adapted to color transmission.

The Utiliscope system is possibly the oldest of those described, and has a number of installations in various types of industry, some of which have been described or shown in photos in past issues of the magazine. No statement as to a proposed switch to color has been received from them as yet.

The Du Mont system uses standard equipment modified to operate at 180 fields per second. Unlike the other systems, it was designed primarily for color. Yet, where color is not needed, it is also available as a monochrome system. For example, the country-wide meeting of Schenley representatives, which was the first closed-circuit program to be "broadcast" was in black-and-white. This meeting consisted of 18 separate groups totalling more than 2,300 persons in cities as far apart as Boston and St. Louis. Transmission over long lines was the reason for use of monochrome in this case, as the frequency limits of the lines would have made color broadcast difficult.

Thanks are due to Diamond Power Specialty Corporation for the ideas underlying the larger number of the illustrations on pages 30 and 31.